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BOOK OF GOOD HEALTH

SUN, SEA, AND SAND AS AIDS TO HEALTHY LIVING

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BOOK OF GOOD HEALTH

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HOME FURNISHING AND DECORATION
Including
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HOME HANDICRAFTS, NEEDLEWORK
AND REPAIRS

***

COMPLETE HOME COOKERY

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BOOK OF GOOD HEALTH

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HOME MANAGEMENT AND ENTERTAINING
A Household Miscellany

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GARDENING AND OUTDOOR WORK

Printed in Great Britain by The Amalgamated Press, Ltd., London.

EDITOR'S INTRODUCTION

IN the ancient civilizations of Greece and Rome, to have a sound mind in a healthy body was the aim of every right-thinking citizen. The statesman who guided the destinies of his country, the legislator who framed the laws, the husbandman who tilled the fields, the soldier who held the frontier and the mariner who sailed the seas, the woman who kept house and ruled the little kingdom of the home—all were persuaded that it was their duty to keep well, to maintain, even increase, their physical fitness and mental alertness, in the interests of their city, their country, their loved ones, themselves.

During the centuries that followed the collapse of the classical culture this fine ideal was often lost sight of and forgotten. In the unutterable squalor and degradation of the Dark Ages men came to regard their bodies as something unclean, and looked on the beauty of women as a snare of the Evil One. This view persisted even until the nineteenth century, when in the Victorian age it companied well with the stuffy rooms, the upholstered furniture, the dust-collecting garb of the women, the ugly and depressing brick boxes that were so general in all classes of society.

Ill-health was the rule, not the exception. One's diseases and petty ailments were a main topic of conversation. Hospitals were founded by the dozen. Medical men abounded—but still unhealth persisted and multiplied. Writing towards the end of the century Edward Carpenter could point to the chronic physical *malaise* as evidence of the failure of civilization, as proof of the essential rottenness of English society.

Of late years, however, there has been a tremendous and far-reaching change. We still have to have hospitals, alas; there are probably more doctors today than ever before; disease and sickness are still only too rife, still demand from each generation a heavy toll. But our way of looking at the question of health and disease has been radically altered. Up to quite recently, men spoke as if sickness was part of the normal lot of everyone born into this world; it was regarded as quite the thing, for instance, for children to run through the whole gamut of infantile ailments, for middle-aged people to be bald and gouty, for old folk to be tottering, toothless and senile.

Since the War, however, we have seen one of our "Elder Statesmen" play strenuous tennis when well past seventy, and our most famous playwright is a devotee of sun bathing. Mothers are not surprised if their children escape mumps or chicken-pox, and multitudes are disgusted if they get a cold in the head. People still talk of human ills, of " operations " and so on, but they regard these things as exceptions, not as part and parcel of a normal life. Medicine is no longer regarded as a matter of pills and coloured liquids—time was when a patient felt insulted if he left the surgery without a neatly-wrapped bottle or at least a prescription—but as essentially a preventive of disease and ill-health. The doctor's job, it is becoming realized ever more widely, is not to cure people when they are ill, but to prevent them becoming ill.

Many agencies have co-operated to produce this great and beneficial change. The public health administration has been responsible for much, and so, too, has been the pioneering work of an army of enlightened physicians and surgeons. The " healthy life " movement, arising out of the revolt against Victorian stuffiness and inspired by a belief in the virtues of good food, fresh air and clean living, has also worked wonders.

Yet another extremely important factor has been the dissemination of sound medical and health knowledge among the great masses of the population. Popular medical works—such as, for instance, " Harmsworth's Home Doctor " and the " Concise Home Doctor "—have had a tremendous sale of recent years, and millions today are acquainted with the rudiments of physiology, know something of the ills our flesh is heir to, and appreciate the how and why of a healthy, well-ordered regimen.

This BOOK OF GOOD HEALTH is in direct succession from the works just mentioned. In its pages will be found a wealth of anatomical and physiological detail; the principal diseases and ailments are described, together with their treatment; guidance is given in the arts of keeping fit and preserving, even enhancing, natural beauty. And throughout, the new, the typically modern, note is sounded.

Not as the Victorians thought, that disease is something that comes to everybody and must be expected and endured with patience, do we think today. Not ill-health but good health is the normal. We should expect to keep well—should expect and manfully strive to see that we come up to our expectation. The BOOK OF GOOD HEALTH, let us hope, will be to many a source of vital information, of encouragement and guidance in the supremely important art of good living.

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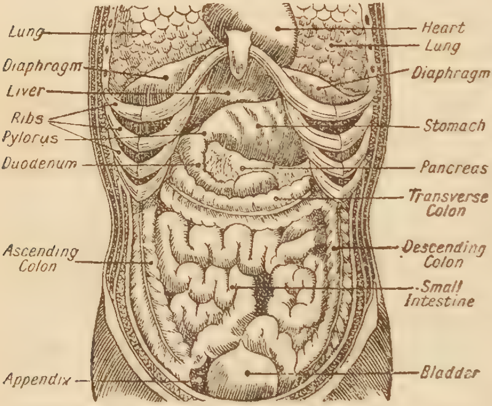
BOOK OF GOOD HEALTH

A.B.C. LINIMENT. Compound liniment of aconite, consisting of equal parts of the liniments of aconite, belladonna, and chloroform, is known by this name. It is used for relieving lumbago, sciatica, neuralgia, etc., and may be rubbed over the part or applied on lint covered with oiled silk. The bottle should be shaken well and the liniment used with caution to begin with, as it may irritate the skin in some people. *See* Aconite; Liniment.

ABDOMEN. Abdomen is the technical name for the belly. It is separated from the chest, which lies above it, by the diaphragm, or midriff, a flat, thin dome of muscle and membrane which stretches right across the middle of the body. This great muscle is arched upwards towards the chest. It is attached all round to the ribs and the spinal column, and when it contracts it flattens itself so that the contents of the abdomen are compressed and the size of the chest is increased by what amounts to a temporary sinking of its floor. This contraction of the diaphragm is an essential part of the act of breathing. When it contracts it compresses the organs that lie beneath it, and thus assists in maintaining their activity. This is one of the reasons why breathing exercises are so valuable. It is, further, a reason why what is called the diaphragmatic method of breathing should be practised by everyone. The abdomen is bounded in front by a thick wall of flat muscles which normally keep up a gentle pressure on the contents. These are attached above to the lower ribs, behind to the spinal column, and below to the hip bones or pelvis.

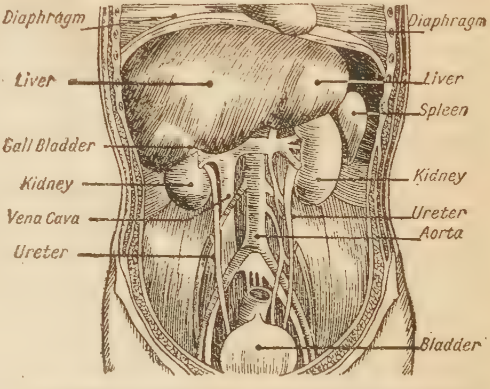
The abdominal contents must now be considered. The cavity in which they are contained is lined by a smooth membrane, which is also spread out upon the surface of all the organs, so that there is no friction and they can move freely against one another. This important and complicated membrane is called the peritoneum. Amongst other important structures inside the abdomen is the alimentary canal, including the stomach and the bowels. In the diaphragm there is a large opening through which the gullet passes into the stomach. The stomach lies immediately under the diaphragm on the left side and leads into the first portion of bowel, which is called the small intestine, or small gut. This, after a coiled-up and complicated course of 20 to 25 feet, passes into the large intestine, or large gut. The large gut, about 4½ ft. long, starts in the right-hand lower corner of the abdomen and passes up the right side, then across to the left and down the left side, ending in a straight part called the rectum. Close to the junction of the large and small intestines is the appendix.

The liver, which is the largest gland in the body, is situated immediately under the diaphragm, most of its bulk lying to the right. Underneath the liver is a small bag called the gall bladder, which acts as a reservoir for part of the bile secreted by the liver. The bile coming from the liver or gall bladder passes through a small tube which opens into the small intestine some 4 or 5 in. from its beginning.


Lung
Diaphragm
Liver
Ribs
Pylorus
Duodenum
Ascending Colon
Appendix
Heart
Lung
Diaphragm
Stomach
Pancreas
Transverse Colon
Descending Colon
Small Intestine
Bladder

ABDOMEN. Abdominal organs shown diagrammatically. The pancreas is actually situated more behind the stomach and the transverse colon higher

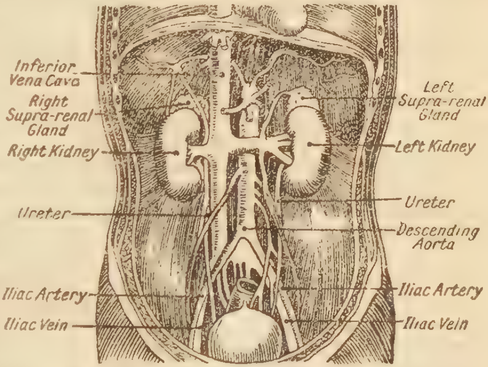
In considering the remaining organs of the abdomen, it will be found convenient to divide it up into nine areas, three rows of three. The middle area of the top row corresponds very exactly to what is known as the pit of the stomach. It is called the epigastrium. The areas on either side of this are called the right and left hypochondrium. The greater part of these three regions is occupied by the liver and the stomach, but in the left hypochondrium there is also the spleen. This lies very far behind, under cover of the back parts of the lower ribs on the left side. Right across this region


Diaphragm
Liver
Gall Bladder
Kidney
Vena Cava
Ureter
Diaphragm
Liver
Spleen
Kidney
Ureter
Aorta
Bladder

ABDOMEN. The stomach and bowel have here been removed, revealing the liver, spleen and kidneys, and also the aorta and the vena cava of the abdomen also there lies a long, narrow organ called the pancreas. This produces a secretion which passes through a narrow tube or duct into the small intestine, making use of the same opening as that which serves for the entry of the bile.

Behind the stomach also there is a large collection of nervous tissue called the solar plexus. A blow from a fist or a football on the pit of the stomach seriously affects the solar plexus and gives rise to the sensations known as being "winded."

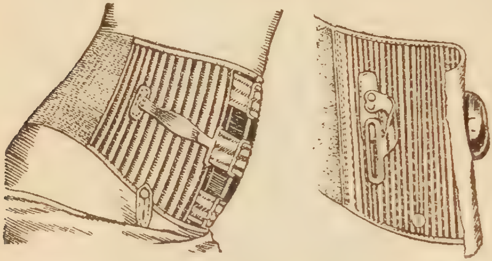
In the middle zone of the abdomen the most important organs besides the bowels, which are found in all the areas of the abdomen, are the two kidneys, which lie one on each side against the back wall of the abdomen, rather close to the middle line. At the top end of each kidney is a much smaller gland which is nevertheless exceedingly important, and is known as the supra-renal or adrenal (q.v.) gland. The secretion of each kidney passes downwards from it through a long and narrow tube called the ureter. The two ureters open into the lower part of the urinary bladder.



ABDOMEN. By removing the liver, the kidneys and supra-renal glands come completely into view. The left kidney is situated slightly higher than the right

The abdominal wall mainly consists of a number of flat muscles. Every muscle has the property of elasticity, and is a most important factor in the health of the body. It permits the contents of the abdomen to vary in amount without inconvenience; and it constantly exercises a gentle pressure on all the abdominal contents. In rational systems of physical exercise the muscles of the abdominal wall are recognized to be as important as the muscles of the calf or arm.

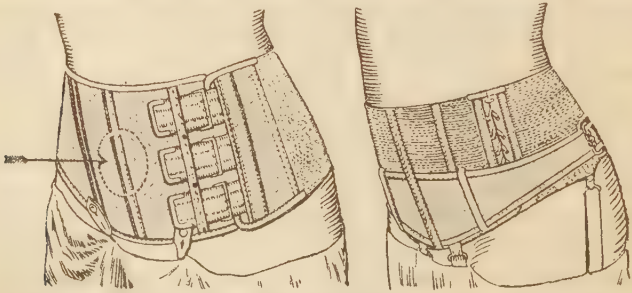
At various points in the abdominal wall there are partial gaps or openings. It is obvious that the existence of any such gap offers an opportunity for the escape or partial escape of one or other of the organs which lie inside, under very considerable pressure. Thus when the pressure is very suddenly increased, as it sometimes is during violent physical exertion, a portion of the abdominal contents may make its way through one of these weaker places. This is called a hernia, or rupture. One of the useful results of keeping in good condition is that the abdominal wall remains firm and elastic, and far less likely to permit of a rupture than the flabby and inelastic abdominal walls of people who lead sedentary or self-indulgent lives. Increased pressure in the abdomen, due to the accumulation of fat and sagging of the abdominal contents, may also lead to rupture. *See* Abdominal Exercises; Appendicitis; Breathing Exercises; Hernia; Indigestion; Intestine; Respiration; Tympanites; Visceroptosis; and under the headings of the various organs mentioned.



ABDOMINAL BELT. Belt for supporting a displaced kidney; right, showing inflatable inner pad

ABDOMINAL BELT. It is sometimes desirable to give support to the abdominal wall by wearing a belt; for example, during pregnancy or after labour, after abdominal operations, in abdominal hernia, and in visceroptosis or sagging of the abdominal contents. A steady pressure is obtained by including in the belt a woven elastic fabric, and this may be reinforced by straps or lacing. Where pressure is required, more particularly on certain parts of the abdominal wall, for example, to keep up a kidney which tends to drop, or to retain a hernia, a pad of an appropriate size and shape is fixed to the inside of the belt. It is important that a belt be properly fitted, otherwise it may be not only uncomfortable but ineffective. *See* Truss.

ABDOMINAL EXERCISES. The functional activity of the abdominal organs is promoted by deep breathing, and breathing exercises are therefore also abdominal exercises. Vigour in the muscles which form the anterior abdominal wall is required for



ABDOMINAL BELT. Left, belt for umbilical hernia, with position of inner pad indicated by arrow. Right, maternity belt with side lacings
Courtesy of Salt & Son, Ltd.

correct breathing and also for giving support to the abdominal contents, and the regular performance of certain simple exercises will increase this vigour. The easiest exercise of this type consists, when lying on the back, in pressing the flat of the hands against the abdominal wall and then raising the hands by causing the muscles of the wall to contract. By varying the pressure of the hands the effort required from the muscles can be graduated.

A more strenuous type of exercise is, when lying on the back, to rise into the sitting posture without any help from the arms; or the legs may be raised into a vertical position, each leg alternately and then both together. Each of these movements should be done slowly and for a beginning it would suffice to raise first the body and then the legs five times, adding a movement each day until twenty of each is being performed. If these exercises, which are illustrated in Plate 1, cause any pain in the groins it will be safer to content oneself with the easy exercise first mentioned. *See* Breathing Exercises; Exercise.

ABORTION. The expulsion of the product of conception or immature child from the womb before the end of the twenty-seventh week constitutes abortion. This period roughly marks the point when the child becomes capable of independent existence.

It would appear that abortion is more likely to occur in the later months of this period with the first child, and in the earlier months in the case of women who have already been pregnant, and this latter fact would be explained by the existence of uterine disease, dating in all probability from a prior abortion or confinement. The greater the mother's age the more likely abortion is to occur.

There is a large number of possible causes. It may follow any violent shock or emotion, or excessive physical exertion, as in lifting weights, walking too far or too fast, dancing and so on, or may be caused by a fall. Illnesses, as, for example, infectious fevers, are dangerous in this respect, and kidney diseases are particularly so. It is not safe for pregnant women to suffer from severe or prolonged diarrhoea, and strong purgatives should never be used. Displacements of the womb and other diseases of the genital organs are responsible in some cases.

It may happen that when grave danger threatens the life of the mother a doctor may consider it necessary to terminate pregnancy, but the induction of abortion apart from such circumstances is, of course, criminal, and the drugs and manipulations used for this purpose are likely to make the mother very ill and often cause her death.

Abortion occurring early in pregnancy may be mistaken for a menstrual discharge, and women who may be pregnant and have a period when they lose more blood than usual would often save themselves much subsequent trouble by resting and taking care, or even consulting their doctor at such a time. When abortion is threatening, the patient may feel weary and depressed, and have a weight in the lower part of the abdomen ; the hands and feet may be cold. Then bleeding occurs, and may be accompanied by pain in the back, loins and hips. The pains may be severe, resembling labour pains, especially when abortion occurs well on in pregnancy.

On the first hint of abortion the patient should be put to bed and the doctor summoned. Strict rest will be necessary, and if the signs are definite it is better to use a bed pan and retain the recumbent position when the bladder or bowels are being relieved. Food should be light, and nothing should be taken hot. The bowels should be kept regular with small doses of castor oil, one or two teaspoonsful, and repeated if necessary. Should clots come away they should be kept for inspection by the doctor.

The abortion may be incomplete—that is, portions of placenta or membranes may be left in the womb. These may come away without interference, but, on the other hand, the doctor may have to remove them. If left, they may give rise to severe bleeding, or may putrefy and cause blood poisoning ; and this risk of retained materials makes it desirable to have medical assistance in cases of abortion. The patient should keep her bed for at least a week afterwards, and the external parts should be washed with antiseptic lotions, and the same careful attention paid to her as after an ordinary confinement. If she becomes pregnant again, she should keep in close touch with her doctor for observation of the urine and guidance regarding the régime she must follow. *See* Childbirth ; Pregnancy.

ABRASION. This name is applied to a superficial injury of the skin or the membrane lining the mouth, nose, etc. Abrasions usually bleed only slightly. They should be kept clean, and an abrasion of the skin may be painted over with flexible collodion or new skin, or dabbed with iodine and, if the occupation is a dirty one, covered with a dressing. Exceptional care should be taken in the case of elderly and debilitated people in whom the circulation is poor, especially in the fingers and toes. *See* Antiseptic ; Collodion ; Gangrene ; Wound.

ABSCESS. An abscess is a localised collection of pus or matter separated from the healthy tissues by a more or less definite layer of altered tissues known as the abscess wall. It is due to the invasion of the tissues by microbes, which may be introduced through a wound of some sort, or may reach the tissues from within as when microbes are brought to a particular spot by the blood.

An abscess may be acute or chronic. The signs of an acute abscess are at first those of inflammation, and when one forms where it can be observed, say, on a limb, it is seen that the part becomes reddened, it feels hard and hot, and the patient complains of pain. These are the signs of inflammation, and they may disappear and the part regain its normal condition, or they may increase in intensity, and about the centre of the hard area an elasticity develops which points to the presence of fluid. Moreover, it may be noticed that where the skin has been pressed little depressions have been left which take some time to fill up again. This is known as pitting, and is due to the skin over the abscess becoming dropsical.

At the beginning, if the inflamed area is of any size, the patient merely feels feverish and out of sorts, but if pus forms the temperature shoots up, and he may suffer from what is known as a rigor (q.v.).

The pus in the abscess may spread in different directions, but it usually works its way to the surface, and one spot will probably be found where the redness has become darker and where the pain is greater. The abscess is said to point at this spot, and sooner or later the skin gives way and the pus gushes out. This is a thick, creamy fluid, generally of a yellow colour and without smell. With the discharge the pain is relieved, and the patient's general state is usually much improved. The discharge goes on for some days, gradually diminishing till it ceases; the signs of inflammation disappear, and the parts regain their normal appearance. While the pus is forming, the part should be put at rest, and, in the case of a limb, elevated on a pillow or sling. Hot fomentations or poultices may be put on to hasten the process.

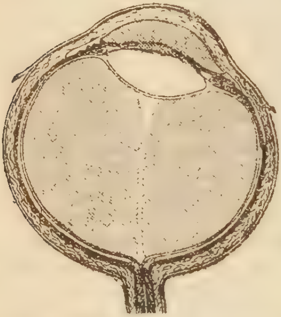
But when the pus has formed it should be let out by the doctor as soon as possible instead of waiting for the abscess to burst. There is not only much unnecessary suffering involved in the delay, but some danger of blood poisoning. Besides, the opening made by the doctor will give free vent to the pus and diminish the danger of the opening closing up unduly before the abscess is cleaned out. Poultices should not be applied after the abscess has been opened.

A chronic abscess in the great majority of cases is due to the tubercle bacillus, the microbe of tuberculosis. From the fact that it forms without the usual signs of inflammation being present, it is also known as a "cold" abscess. There may be little or no general disturbance and no pain. When tubercle bacilli invade the tissues new cells form round them for the purpose of walling them off, but, owing to the poisonous effects of the microbes, these cells undergo fatty degeneration and die, so that a cheesy mass develops. In the course of the fight between the tissues and the microbes this mass becomes bigger, though sometimes the tissues prevail, and there results a scar simply or a hard nodule owing to lime being deposited in the mass. If the bacilli prevail, however, the mass is liquefied, resulting in a "cold" abscess. This forms commonly in connexion with bones, joints or glands.

The fluid is surrounded by a wall of granulation tissue or proud flesh, and as the contents of the cavity increase the fluid extends from its first site along the lines of least resistance. This is sometimes determined by gravity, and an abscess which begins in front of the spine, somewhere about the middle of the body, while it may come to the surface just above the small of the back, may, instead, travel downwards inside the sheath of the psoas muscle, which lies by the side of the spine on each side. This is called a psoas abscess, and it may open at the lower part of the abdominal wall or in the thigh; it has even been known to point at the ankle.

The treatment of such an abscess is the treatment of tuberculosis, namely rest, fresh air, sunlight, an abundant nutritious diet and cod-liver oil, combined with such surgical interference as may be necessary. Such an abscess should not be allowed to burst of itself, as when it is open there is a great risk of the cavity becoming infected with the ordinary pus-forming microbes, with a resulting chronic discharge.

When an abscess of any kind continues to discharge along a narrow track the latter is known as a sinus, and where an abscess has formed between two hollow organs and has left a communicating passage between them it constitutes a fistula. This may occur, for example, between the lower bowel and the bladder, and a fistula may also form between a hollow organ and the surface of the skin. *See* Degeneration; Dressing; Fistula; Inflammation; Sinus; Tuberculosis.


ACCOMMODATION. Horizontal section of eye, dotted line showing convexity of lens obtained

ABSORBENT. *See* Charcoal; Cotton Wool; Dressing; Gamgee Tissue; Sphagnum.

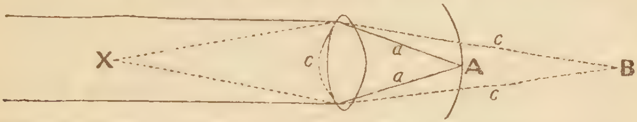
ACARUS. This is the technical name for the kind of mite which causes the skin disease known as the itch or scabies (q.v.).

ACCIDENT. *See* Antidote; Asphyxia; Bleeding; Fainting; First Aid; Fit; Fracture; Poisoning; Transport of the Sick and Wounded.

ACCOMMODATION. The process by which the focusing apparatus of the eye is modified in order to produce on the retina a distinct image of objects at varying distances is known as accommodation. For clear vision of objects at 16½ feet or beyond no change in the eyes is necessary, but for nearer objects the lens must become more convex.

The lens is within a capsule which is supported all round its circumference by a suspensory ligament, seen here in section. The ligament is tense and drags on the capsule so that the anterior surface of the lens is more or less flattened. The ciliary muscle is attached to the front of the suspensory ligament all round, and when its fibres contract it draws the ligament forwards, thus easing the tension, and the anterior surface of the lens bulges forward. The greater the bulge the more powerfully must the muscle be contracting. When the muscle relaxes, the elasticity of the suspensory ligament restores this to its original position and the lens resumes its first shape.

It follows, then, that in doing near work—for example, reading—one is undergoing muscular exertion, and if too much near work is done, or if the general health is below par, the eyes may be easily tired. The power of accommodation diminishes as one gets on in life, generally after the age of 40, through hardening of the lens, and this is why glasses become necessary for near work.



ACCOMMODATION. Rays from near object (X) are, through accommodation (c), focused (a, a) on retina (A) instead of behind (B)

Accommodation may be lost from paralysis of the ciliary muscle, a not infrequent occurrence in diphtheria, and inability to read print in people who have suffered from slight sore throats should always raise suspicion of this disease. Belladonna and similar drugs paralyse the ciliary muscle and accommodation is lost. The effort to read small print is very tiring to young children, and before the age of eight it should be avoided, as also similar occupations like threading needles and fine sewing. Headache is not infrequently due to strain of this kind. *See* Asthenopia ; Eye ; Spectacles.

ACCOUCHEMENT. *See* Childbirth.

A.C.E. MIXTURE. A mixture of alcohol, chloroform and ether, which is often used to produce unconsciousness for surgical operations, is known by this term. It is taken easily by children. *See* Anaesthetic.

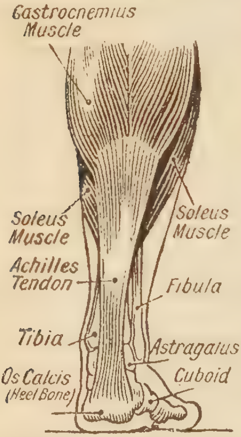
ACETANILIDE. Also known as antifebrin, acetanilide is a crystalline substance which was one of the first powerful drugs introduced to lower the temperature in fever. It is now recognized, however, that active measures to lower the temperature are not desirable unless it is dangerously high, and that then the best remedy is the application of cold water by sponging baths or packs. Acetanilide, moreover, is dangerous when used for this, or, indeed, for any other purpose. It has been used for headache and neuralgia, and is contained in some proprietary headache cures. It is not safe, therefore, to indulge in such preparations without knowing what is in them.

Acetanilide may produce serious collapse and difficulty of breathing, even when given in moderate doses. The patient should lie down, and vomiting may be induced by a tablespoonful of mustard in half a glass of water. Hot drinks should then be given and the patient kept warm with hot-water bottles. The doctor should be sent for at once. *See* Antipyretic ; Fever.

ACETIC ACID. The essential constituent of vinegar is simply a dilute and somewhat impure solution of acetic acid in water. Glacial acetic acid acts as a caustic and may be employed for the removal of warts. It should be applied by a glass rod or on a small brush, or by rolling a little piece of cotton wool on the end of a match. Care must be taken that the acid does not trickle over the surrounding skin, or it will cause irritation and pain. As a precaution against this the skin round the wart may be smeared with vaseline. The application is made each day; if redness and pain occur it should be discontinued till signs of irritation disappear, and then resumed.

If glacial acetic acid is drunk accidentally it will cause a burning pain in the mouth, throat and stomach. An antidote such as chalk or whiting mixed in water should be given at once, and later white of egg, olive oil or other demulcents.

Toilet vinegars consist of pure acetic acid combined with perfumes. One or two teaspoonfuls are added to the water when washing, and this produces an astringent effect on the skin. Dilute acetic acid is a five per cent solution of the strong acid. It makes a good antidote for poisoning by strong alkalies, such as caustic potash or soda, washing soda or strong ammonia. Two or three tablespoonsful should be given in a little water.



ACHILLES TENDON. Back view, showing how it connects the heel and calf

ACHE. *See* Backache; Headache; Indigestion; Pain; Toothache.

ACHILLES TENDON. This is the name given to the tendon or sinew at the back of the ankle, by which the muscles of the calf are attached to the heel bone. It occasionally snaps, as in the case of an elderly person dancing, but easily heals with rest. Short of snapping the tendon, an undue strain may give rise to inflammatory conditions about its attachment to the bone and cause a painful heel. Here also rest, and the use of a boot with a raised heel when the patient begins to get about, is usually sufficient. *See* Foot; Leg.

ACID. Two classes of acids may be distinguished: (1) inorganic or mineral acids, such as sulphuric, nitric and hydrochloric acids; and (2) organic acids, of which examples are lactic, citric and uric acids.

Strong mineral acids act as corrosive poisons—that is to say, they destroy living tissues with which they come into contact.

Signs of their having been taken will be apparent on the lips and within the mouth. They produce a burning sensation within the mouth, throat, and stomach when swallowed, and this is followed by great pain in the abdomen, by vomiting and perhaps purging. The doctor should be summoned at once. In the meantime, no attempt should be made to cause vomiting by the use of an emetic or otherwise.

Water may be given to dilute the poison, and then some alkaline substance, baking soda, soap, whiting, chalk or magnesia in water. Thereafter demulcents such as white of egg, arrowroot, salad oil, etc., will be useful. Hot fomentations or poultices will help to relieve the pain, and sponges or cloths wrung out of hot water and applied to the throat may make the breathing easier. *See* Antidote ; Poisoning ; the various acids.

ACIDITY. An acid or burning taste or sensation at the back of the throat and tongue is termed acidity, or more popularly, heartburn. The term acidity is also used for acid dyspepsia, where there is undue or improper formation of acid in the stomach. Of this there are two distinct kinds which must be carefully distinguished. The first consists in the excessive secretion of gastric juice, including the normal acid of the stomach —hydrochloric acid—and is known as hyperacidity (q.v.).

The other form of acidity is due to the opposite cause. Here the stomach is incapable of producing the right amount of hydrochloric acid. This normal acid of the gastric juice is a powerful antiseptic, habitually destroying innumerable bacteria which are constantly taken in with the food. When, therefore, owing to causes which are discussed in the article on digestion, the secretion of hydrochloric acid is diminished or absent, these germs may flourish in the stomach.

The characteristic symptoms of fermentative acid dyspepsia are easy to recognize. About half an hour after a meal these acids may begin to be formed ; together with them there is produced a large amount of gas which tends to distend the stomach and increase the discomfort of the patient. In addition there is the frequent bringing up into the back of the throat of an acid, acrid, burning fluid, a symptom known as pyrosis.

Acidity due to fermentation may be relieved in various ways. The most common is to give something which neutralises the acids which are formed. This is usually baking soda—that is, bicarbonate of soda—or magnesia, or some other alkali. The following is a useful combination of alkalies with bismuth which acts as a sedative :

Bismuth carbonate	5 grains
Bicarbonate of soda	10 grains
Light magnesium carbonate	10 grains

To be taken stirred up in a little milk or water when necessary.

The B.P. compound lozenges of bismuth provide another good remedy. A more desirable method of treating fermentative acidity is to give the stomach something which enables it to kill the germs which produce the acids. For this purpose hydrochloric acid itself is often given and is very useful. But the best treatment is that which restores the health of the stomach. *See* Digestion ; Hyperacidity ; Indigestion.

ACIDOSIS. In the late stages of diabetes, in starvation, in the severest form of vomiting in pregnancy, in one form of chloroform poisoning, and in other conditions, the blood is found to contain certain acids, among them diacetic acid and acetone. This condition is referred to as acidosis. The acids are derived from the fats of the body breaking down in an unusual way, and they do so because the tissues are not being supplied with a sufficiency of glucose. The presence of these acids in the blood produces several symptoms, two of the most striking being the drowsiness, perhaps leading on to coma, observed in diabetes, and a form of dyspepsia or difficulty in breathing in which the patient appears to suffer from "air-hunger."

Acidosis in diabetics is treated by insulin, glucose and, sometimes, bicarbonate of soda. Insulin has also been used when the disorder had a different origin. *See* Diabetes.

ACNE or ACNE VULGARIS. This is the technical name for a very common ailment of the skin. The special feature of the disease is the development of little painful pimples which become filled with matter and burst, leaving more or less scarring. It is commonly seen on the face, but may also be found on the chest, the back or elsewhere. It usually occurs somewhere between the ages of fifteen and twenty-five, and is very apt to annoy boys when they start to shave.

Its association with the period of puberty, the stage when the adult phase of life is beginning, is due to the fact that at this time there is an increase in the development and activity of all glands. The oil glands of the skin share in this, and, as a result, the skin may become greasy and of a sallow tint. Later on firm plugs form in the orifices of these glands and develop blackheads. Then inflammation takes place round the plugs and papules or pimples appear.

The disease is due to the invasion of the glands by a microbe, but there are certain conditions which seem to predispose, notably anaemia, constipation, dyspepsia, and genital disorders in women.

People with dark, greasy skins should be very thorough in their ablutions. Night and morning the face should be washed with very hot water and a superfatted soap. Plenty of lather should be produced and rubbed vigorously into the skin all over. An ether soap might then be used if there is any difficulty in getting rid of the grease on the skin. In drying the skin should be rubbed very briskly with the towel. If blackheads are present, the face after washing should be covered for a few minutes with a towel wrung out of water as hot as can be borne, and an attempt should then be made to squeeze out as many of the blackheads as possible. For this purpose a comedo extractor (obtainable from a chemist) may be used, or the skin is pierced by a fine sterilized needle, and the blackheads are pressed out by the finger-nails protected by a thin silk handkerchief.

When papules are present, in addition to the foregoing, treatment should include the application of sulphur. At bedtime the following lotion should be applied and allowed to dry and remain on:

Precipitated sulphur	1 drachm
Rose water	3 ounces
Lime water	3 ounces

Sop on with a little cotton wool.

A good method is to use a lotion by day and an ointment by night. The following ointment might be employed:

Precipitated sulphur	1 drachm
Starch powder	2 drachms
Powdered zinc oxide	2 drachms
Vaseline or soft paraffin	4 drachms

Where acne occurs on the back, if, as usually happens, the patient also suffers from dandruff of the scalp, this must be cleaned off if progress is to be made. It is also necessary to deal with any of the predisposing conditions mentioned above, anaemia, etc. The bowels should be kept regular, if necessary by the use of an aperient or saline. Sugar and starchy foods should be taken very moderately, and such things as pastry, pickles, greasy food or baked meats, beer and other malt liquors and sweet wines, should not be taken at all.

General fitness should be aimed at by a sufficiency of sleep and of open-air exercise. The treatment takes a long time, and it may be necessary to try other drugs and applications which the doctor will prescribe. *See* Dandruff; Indigestion; Skin.

ACNE ROSACEA. The skin complaint known as acne rosacea owes its name to the fact that it begins with flushing, usually of the face, and that later on papules or pimples, resembling those of acne vulgaris, may appear on the affected skin. Unlike the latter disease, which begins in early life, acne rosacea is a disease of middle age, and more often affects women. Disorders of the stomach and of the genital organs in women are prominent amongst its causes. It may occur in those who have always abstained from alcohol, but alcohol and also tea and coffee have much to do with it in other cases. Exposure of the face to heat or to cold winds are amongst the possible causes of this troublesome skin affection.

Treatment should be directed to the cause, but in all cases alcohol, coffee and probably tea must be avoided. The bowels should be regulated, cascara being a suitable drug for the purpose.

The diet should be plain and moderate in quantity. The affected skin may be painted twice daily with the following lotion :

Strong solution of lead subacetate	4 drachms
Liquor carbonis detergens	4 drachms
Rectified spirits of wine	4 drachms

Or the following paste may be applied :

Resorcin	15 grains
Zinc oxide powder	2 drachms
Powdered talc	2 drachms
Vaseline	to 1 ounce

When, however, the disease is of long standing and the skin is thickened, it is necessary to resort to treatment by light or X-rays, or to surgical measures.

ACONITE. This powerful drug is obtained from the root of the aconite plant (Aconitum napellus) or monkshood. The active principle of the drug is the alkaloid aconitine, a most dangerous poison. Aconite slows the action of the heart, reduces the temperature and increases perspiration. It paralyses nerve-endings, and is used to relieve pain, in neuralgia, etc., usually in the form of the liniment.

The root has been eaten in mistake for horseradish with fatal consequences. The two can be readily distinguished, however, if attention is given to the matter. The root of horseradish is cylindrical, that of aconite conical. Horseradish root is of a yellow or light buff colour on the outside, while that of aconite is dark brown. When chewed, aconite root causes a numbness and tingling of the mouth, while horseradish has a sweetish, pungent taste.

Poisoning by Aconite. The symptoms of poisoning include tingling in the mouth, pain in the pit of the stomach and severe vomiting, an icy wet skin, prostration and a feeble, irregular pulse. The doctor should be sent for at once, and meanwhile an emetic, consisting of a tablespoonful of mustard in a glass of water, should be given. The patient should be kept lying down in bed, and warmth promoted by hot-water bottles and chafing of limbs. Hot, strong tea or coffee should be given freely, and if there is difficulty in swallowing they should be given as an enema. *See* Antidote ; Poisoning.

ACROMEGALY. In this rare disease, as the derivation of the name implies, the extremities of the body become enlarged. The feet and hands and head, and notably the bone of the lower jaw, become overgrown. It is due to the alterations in nutrition caused by disease of a small gland inside the head which is known as the pituitary body (q.v.). Thyroid extract benefits some cases, whilst in others removal of a portion of the growth by surgical operation has proved of value.

ACTINOMYCOSIS. This disease sometimes occurs in man and not infrequently in some of the lower animals. It is due to the growth in various parts of the body of a fungus called the actinomyces or ray fungus. It may be acquired by chewing raw grain or by inhaling the dust when this is being ground. It commonly attacks the jaw, but it may also affect the tongue, the lungs, the intestines, the skin, and other parts.

People who handle raw grain should avoid putting it into their mouths and should wash their hands before taking food. If they are exposed to dust in grinding, winnowing, etc., respirators should be worn, a desirable precaution in any case as dust irritates the lungs. The disease is treated by giving large doses of potassium iodide, though surgical measures may also be necessary.

ACUTE. Those illnesses which have a rapid onset and which run a short course with marked symptoms are termed acute. They are nearly all due to microbes. The other terms which are usually contrasted with acute are subacute and chronic.

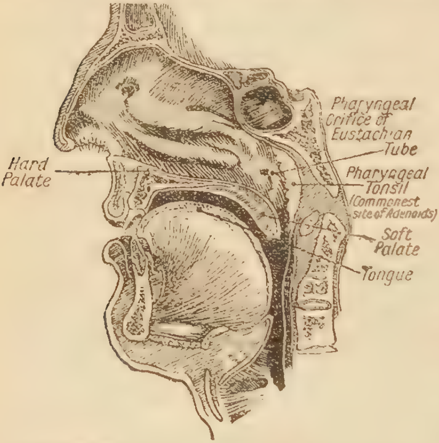
ADDER BITE. The bite of the variety of adder or viper found in Great Britain is rarely fatal, except in children and weakly persons. Symptoms and treatment are discussed under the heading Bite.

ADDISON'S DISEASE. The chief symptoms of this disorder are bronzing of the skin, profound muscular weakness and vomiting. They result from the lack of the internal secretions of the supra-renal capsules, two glands which are perched on the upper ends of the kidneys, and notably of adrenalin. The most that can be done is to ensure warmth and rest, with a light, easily digested diet, including plenty of milk. Sunshine and fresh air are also important. *See* Adrenal.

ADENITIS. This word denotes inflammation of a gland. A common form of adenitis is inflammation of the lymph glands of the neck due to their invasion by the tubercle bacillus, and commonly known as "glands in the neck." *See* Lymphatic System.

ADENOID. The lining membrane of that part of the pharynx which lies behind the nose is studded with a considerable amount of lymphoid tissue the same as that which composes the tonsils. It is an overgrowth of this tissue which constitutes adenoids. These exist as fingerlike processes or bosses on the walls of the naso-pharynx and are usually associated with enlarged tonsils. On account of their position they readily obstruct the passage of air from the nose into the throat and sometimes they encroach on the openings of the Eustachian tubes and prevent the passage of air through these tubes into the ears, causing deafness and perhaps earache. This happens more readily because adenoids act as a constant source of irritation and set up catarrh which extends into the nose and may also pass into the ears.

Although they are most commonly noticed between the ages of three and ten, they may occur shortly after birth, and by interfering with easy breathing through the nose may impede suckling and seriously affect an infant's nutrition. At a later age, say between three and four, adenoids will be found to produce a constant "wet nose." The mouth always seems to be open and the child is a "mouth breather." It is not surprising then that children with adenoids frequently suffer from catarrh of the throat and air tubes. For this reason, and through the irritation caused by the adenoids, an irritating hacking cough is common. The voice may become thick and of a nasal quality, and it is usual to find snoring at night. If this condition is allowed to persist a characteristic change takes place in the face, the nose is compressed and the upper teeth become prominent like those of a rabbit.


Pharyngeal Orifice of Eustachian Tube
Hard Palate
Pharyngeal Tonsil (Commonest site of Adenoids)
Soft Palate
Tongue

ADENOIDS. Section of the mouth and nasal cavities showing the common site of the growths

The difficulty of filling the lungs with air produces changes in the shape of the chest. This may take the form of pigeon breast, in which the chest is flattened from side to side and the breast bone is prominent, or it may be flattened from front to back. The chest becomes fixed in this position, with the result that the patient is always a shallow breather and is prone to chest complaints, including consumption. The sleep of a child with adenoids is apt to be disturbed and bed-wetting is common. Such a child is also apt to be peevish and irritable when awake. The expression is often dull and stupid, and the child may be inattentive at school, sometimes no doubt because of deafness and this interferes with mental development.

If the adenoids are small and recent it is possible that correct habits of breathing, the maintenance of a clean nose, and tonic treatment, including plenty of fresh air, may bring about their disappearance; but if the adenoids are firm and tough nothing short of an operation will be of the slightest use in bringing about a proper cure, nor should the other method be tried too long in the absence of signs of improvement. The operation is usually simple and generally it is advisable to remove enlarged tonsils at the same time.

After the operation the child should be put to bed and kept there for two or three days, and it should be kept indoors for an equal time. For the pain which follows the operation ice may be given to suck and this will also help to restrict bleeding. If there is much bleeding at any time the doctor should be sent for. The diet for the first few days will be liquid or semi-liquid and bland, and a return to solid food will depend on the comfort in swallowing and the appetite. No hot food should be given to begin with.

A simple mouth wash is useful and may consist of a weak solution of permanganate of potash, or a mixture of equal parts of borax, common salt, bicarbonate of soda and white sugar, a teaspoonful of which is to be dissolved in a glass of tepid water. If there is a nasty discharge from the nose these lotions may be used for gently syringing it out.

Even after the operation there is still something to be done, and failure to carry out this after-treatment is nearly always the cause of incompleteness in the cure. This after-care consists in supervising the child each day in keeping the nose clean and in practising nose breathing. A beginning should be made in a week to ten days after the operation. For clearing the nose the following drill has been suggested. The child should stand erect and grasp the bridge of the nose, not the compressible part, with the finger and thumb of the right hand. It then takes a long breath through the nose and then blows down forcibly through the nose on to a piece of soft paper held in the left hand. This is repeated several times.

Breathing exercises should be done in the open air if possible. A simple one is to make the child stand erect with his mouth closed. He should then stoop forward about ten or twelve times a minute, breathing out as he descends and in as he raises himself. The exercise should last from five to ten minutes, with rests if necessary, and may be done several times a day. Breathing exercises should be kept up for at least four or five months. If the tendency to sleep with the mouth open persists, it will be necessary to bandage up the lower jaw to prevent it.

To increase the general vigour a tonic may be taken for three or four weeks. The following is a good one:

Iron and ammonium citrate	1 drachm
Cod-liver oil emulsion, B.P.C.	8 ounces

Dissolve the iron in sufficient water and mix. Dose: one-half to one tablespoonful three times a day, after meals.

Instead of this, or alternately with it, one might give syrup of the iodide of iron, in doses of 10 to 20 minims, in water. The food should be plain and nourishing. The child should be as much in the open air as possible, taking such exercise as it is capable of without fatigue. It may be necessary to take it away from school, and if convalescence is slow the feasibility of a month at the seaside or in the country should be considered. *See* Breathing Exercises; Deafness; Tonsil, etc.

ADENOMA. A tumour composed of tissue resembling that of the secreting gland in which it occurs, e.g. the breast, the thyroid, etc., is called an adenoma. Such tumours usually grow slowly and if completely removed do not recur.

ADHESIVE PLASTER. The older form of adhesive plaster consists of resin, lead plaster, and hard soap, melted together and spread on strips of linen. Mead's plaster, which can be obtained in various widths, has a rubber basis, and does not require warming before application, as the other does. These plasters are useful, for example, in bringing the edges of a wound together, strapping on dressings, putting limbs up in extension, covering boils, etc. In using adhesive plaster for the last purpose, a circular opening is made, through which the point of the boil projects and the discharge comes away freely. In strapping wounds several narrow strips are better than one broad one, so that if there is any discharge it has free exit.

ADIPOSE TISSUE. *See* Fat.

ADRENAL. The supra-renal capsules or adrenals are two small bodies placed on the upper poles of the kidneys. They are of immense importance to health in virtue of their secretions, which are taken up by the blood as it passes through them. The secretion of the medulla, or adrenalin, has marked influence in maintaining muscular tone, and the lack of adrenalin owing to disease of the gland accounts for the profound muscular weakness in Addison's disease (q.v.). *See* Endocrine ; Kidney.

AFTER-BIRTH. This is the popular name for the placenta, the spongy mass by which the unborn child is attached to the inner surface of the womb, and through which the circulation of blood in the child is carried on. It is of great importance that the whole placenta should be expelled, as if a portion is left behind either after birth at term or a miscarriage, it is likely to decompose and give rise to blood poisoning. *See* Childbirth ; Placenta Praevia ; Sapraemia.

AFTER-PAINS. During two or three days after childbirth women are liable to suffer pains which resemble, though they are not so severe as, those of labour. They are generally due to the presence in the womb of retained portions of placenta or membrane or of blood clot. The attention of the doctor should be called to their existence. The dose of castor oil which is commonly given on the third day may lead to their disappearance, but if severe, relief may be obtained by the application of hot turpentine stupes to the abdomen, or by the use of an antiseptic douche.

AGORAPHOBIA. A morbid fear of open places is termed agoraphobia. It literally means "fear of the market place." The opposite condition is claustrophobia, or a morbid fear of a closed space, for example, being alone in a room. These symptoms are common in psychoneuroses. *See* Hysteria ; Neurasthenia ; Neurosis.

AGUE. This is a popular name for malaria (q.v.).

AIR. Air is a mixture of gases: 78 per cent of nitrogen, 1 per cent of argon, 20.96 per cent of oxygen, and about 0.04 per cent of carbonic acid gas. Minute quantities of rarer gases may also be present. It contains a varying amount of water vapour. It is quite pure far out at sea and high in the mountains, but elsewhere it holds in suspension organic and mineral impurities, vegetable fibre, dust, pollen, carbon, as well as a variety of microbes. The amount of such substances is high in towns, especially manufacturing centres, in mines, unless means are taken to prevent it, in quarries and in workshops of various kinds.

When polluted air is constantly breathed the carbon and other mineral dust is deposited in the lungs and imparts a grey colour to them, while an excess of dust is likely to result in chronic inflammatory disease, and may predispose to consumption. In a badly ventilated room air becomes impoverished in oxygen, the carbonic acid gas and water vapour are increased and it becomes loaded with particles of animal matter from the air passages of the occupants. Professor Leonard Hill has, however, demonstrated that the bad effects formerly attributed to vitiated air are really due to insufficient circulation of air about the bodies of the occupants, whereby perspiration from the body is diminished and the stimulating effect of air currents on the skin is lost. *See* Damp; Fog; Humidity; Ventilation.

ALBUMEN WATER. *See* Beverages.

ALBUMIN. Albumins are substances of complex character which form a class of proteins. They contain carbon, hydrogen, nitrogen, oxygen and sulphur. They are soluble in water and are coagulated by heat. Albumin enters very largely into the composition of protoplasm which forms living cells and has been defined as the physical basis of life. Egg albumen consists almost entirely of albumin, which is also found dissolved in the blood fluid as serum albumin. *See* Protein.

ALBUMINURIA. In certain circumstances albumin appears in the urine and the patient is said to exhibit albuminuria. Its discovery always gives rise to misgiving, owing to the possibility of its being due to inflammation of the kidneys or Bright's disease, which is the most common cause. But it is also found in other kidney disorders, such as amyloid disease, congestion in cases of heart disease, irritation from drugs, as well as in anaemia, and temporarily in febrile conditions. In the more definite forms of kidney disease, along with albumin in the urine one usually finds casts of the kidney tubules. Inflammation of the urinary tract, for example, the bladder or urethra, also gives rise to albumin in the urine. A constant albuminuria will usually be found a bar to acceptance for life assurance.

The occurrence of albuminuria in pregnant women should always be looked upon as a danger signal pointing to the possibility of eclampsia, and it is a wise precaution for expectant mothers to have the urine examined periodically by the doctor.

In young people, and especially boys, albumin is sometimes found in the urine, apart from the presence of kidney disease; it is found at some time in the day—for example, the evening—while it is absent at others, and may occur only after a cold bath or a meal, much standing or severe exercise. A simple test for albuminuria is to boil a little urine in a spoon or test tube. The urine may become cloudy, but as this may be due to phosphates a few drops of vinegar or acetic acid should be added. The acid will cause turbidity from phosphates to disappear, but will not affect that due to albumin. In the latter event no time should be lost in consulting a doctor. *See* Bright's Disease.

ALCOHOL. By alcohol is generally meant ethyl alcohol, a liquid obtained from the distillation of sugary solutions, either natural sugar derived from malted grain, sugar cane or beet root, or artificial, formed by the action of dilute mineral acids on starch obtained from the potato or other sources.

The percentage of alcohol by volume in the various spirituous liquors is as follows: Brandy, 40–50 per cent (in good Cognac it may be 60 per cent and in liqueur brandy as high as 70 per cent); whisky and rum, 40–50 per cent; gin, 25–30 per cent; beer, light 2–5 per cent, heavy 6–9 per cent; claret, hock, burgundy, 8–16 per cent or a little more; sherry or port, 15–20 per cent, or more; liqueurs, about 40–50 per cent; champagne, 9–14 per cent; stout, 2–5 per cent; cider, less than 4 per cent.

About 1½ ounces of pure alcohol can be burnt up in the body, and therefore act as a food, in the course of 24 hours. What this represents in the case of the various alcoholic beverages can easily be calculated by reference to the foregoing list.

Alcohol increases the flow of the salivary and gastric juices, and in small quantities may stimulate the appetite and digestion; but in large quantities it irritates the stomach, and more than a small quantity taken for any length of time tends to cause chronic gastritis, and may result in degenerative changes in the liver and kidneys (cirrhosis), as well as in the heart, blood vessels, brain and other tissues.

The first effect of a dose of alcohol on the brain and circulation is stimulation, but that effect quickly wears off and later becomes narcotic. When used as an emergency stimulant, as in accidents, only small doses should be given, and hot tea or coffee and sal volatile can do as much good without the risk of untoward after-effects. Its power in warming the body is fallacious. The surface capillaries of the body are dilated and a pleasant warm glow is felt, but if rigours of weather have to be faced immediately afterwards this means that the blood in the body is readily cooled. It is for this reason that alcohol is avoided by workers in very cold climates where an excess might easily lead to a fatal result.

On account of its dilating the arteries, however, its use in small quantities may add to the comfort of some old people.

A serious drawback to the use of alcohol is the risk of a craving being formed, when it is easy for the bounds of moderation to be overpassed.

Poisoning by Alcohol. The effects of an excess of alcohol constitute alcoholism, which may be acute or chronic. The symptoms of the former are more or less known to everyone: the loss of emotional control resulting in pugnacity or a maudlin sentimentality, impairment of memory and judgement, impairment of muscular co-ordination resulting in a reeling gait, thick and slurring speech, awkward movement of the upper limbs and perhaps double vision, nausea and sickness, and then drowsiness which may deepen into coma.

Some of the results of chronic excess have already been mentioned; amongst others are obesity, sterility, multiple neuritis causing paralysis of the limbs, a tendency to apoplexy and insanity. Chronic alcoholics also are always liable to develop delirium tremens. The children of drunkards may inherit an unstable nervous system.

In the treatment of acute alcoholism the first thing to be done is to empty the stomach. An emetic of a tablespoonful of mustard in a glass of water may accomplish this, or the doctor may use a stomach pump or siphon tube. Then hot coffee should be given freely. Aromatic spirit of ammonia, a drachm in a wineglass of water, and 30 grains of ammonium chloride dissolved in water, are other remedies. The patient should be kept warm, and if he is comatose he should be watched, as when he begins to come round he may be sick and some of the vomited matter may get into the air passages.

The treatment of chronic alcoholism is very difficult, and will fail unless the victim can be induced to give up alcohol altogether. It will assist his weakened will-power if he consents to begin his cure in an institution, or to live in a part of the country where liquor is not easily obtainable. *See* Delirium Tremens; Dipsomania; Eau de Cologne; Methylated Spirit.

ALIMENTARY CANAL. The digestive tube extending from the mouth to the anus is known as the alimentary canal or tract. These names also connote the glands which pour their juices into the canal, namely, the salivary glands, the pancreas and the liver. *See* Digestion; Intestine; Stomach, etc.

ALKALI. This name, derived from the Arabic, is applied to certain chemical substances, of which bicarbonate of soda, or baking soda, and carbonate of soda, or washing soda, are perhaps the most familiar examples. These and other alkalies are often used in medicine, most frequently in cases of acidity; for when an alkali encounters an acid the two unite and form a new substance known in chemistry as a salt, which has the characteristic properties of neither; in other words, they neutralise each other.

Poisoning by Alkalies. The strong alkalies, caustic soda, caustic potash, strong ammonia, and the corresponding carbonates, act as corrosive poisons, destroying the tissues with which they come into contact. Emetics should not therefore be given, but while awaiting the doctor give an antidote in the form of weak acids, vinegar, lemon, or lime juice, in about half a pint of water. Follow this up with bland liquids, such as milk, the white of an egg beaten up in water, barley water, thin arrowroot, gruel, or olive or linseed oil. A fomentation or poultice may be placed over the abdomen for the relief of pain, and, if there is difficulty in breathing, sponges or cloths wrung out in hot water should be applied to the throat. The patient should be kept warm, and hot-water bottles put to the feet. *See* Antidote; Poisoning.

ALKALOID. A large number of important substances are called alkaloids because chemically they resemble ammonia in acting as bases and forming salts with acids. The most important alkaloids are obtained from plants, many of which are invaluable. The active principles of nearly all the important drugs derived from the vegetable world are alkaloids. Tea and coffee owe their virtues to the presence of an alkaloid, theine or caffeine; opium or laudanum contains, amongst other alkaloids, morphia or morphine; nux vomica contains strychnine; belladonna, atropine; and cinchona bark, quinine. Nearly all alkaloids are highly poisonous except when taken in minute doses. Warm, strong tea is a handy antidote in poisoning by alkaloids, the tannic acid which it contains forming insoluble tannates with these substances. *See* Poisoning.

ALMOND. The sweet almond is very nutritious, and is often used as a food in diabetes, for it contains no starch, and can be made into a sort of flour which produces palatable biscuits and bread. The bitter almond contains a special kind of oil called the essential oil of bitter almonds, which is formed when the substance of the almond is mixed with water. This is quite distinct from the ordinary oil obtained from both the sweet and the bitter almond, which is known as almond oil, and is a bland, harmless, pleasant substance often used in ointments. The oil of bitter almonds is not in itself poisonous. It has a very delicate flavour, and is often used to flavour sweets. It must, however, be very carefully purified before being used in confectionery, for during the course of its production there is also produced the deadly poison, prussic acid, and this is why death has so often followed the eating of bitter almonds.

Poisoning by Bitter Almonds. In a case of poisoning the doctor should be summoned and cold water dashed on the patient's face and chest. As soon as he is roused he should be given a tablespoonful of mustard in half a glass of water. While the emetic is being prepared vomiting may be induced by tickling the back of the throat with a feather or with a paper spill. The patient is then undressed, dried, and put to bed, being kept warm by hot-water bottles or by chafing the limbs. Ammonia or smelling-salts should be held below the nose, and a teaspoonful of whisky or brandy given every ten minutes for a few doses. If breathing has stopped, artificial respiration should be started and kept up till the doctor arrives. *See* Hydrocyanic Acid.

ALOES. Among purgative medicines few have been so widely used as aloes, for in addition to pharmacopoeial preparations it is very largely used in patent medicines of this nature. The active principle of this juice is called aloin, and is often used by itself in medicine.

The chief use of aloes and aloin is in constipation. When the drug enters the intestine it stimulates the movements of the muscular tissue that is included in the walls of the intestine, its principal effect being on the large bowel; and it also increases the flow of the intestinal juices. As the use of aloes by itself usually causes griping, it is generally given in combination with some other substance which prevents this, for example, hyoscyamus, belladonna, or a carminative. In addition to moving the bowels, aloes has a tonic effect on the digestion. It produces its purgative effect in about twelve hours, so that if it is desired that the bowels should move about 8 o'clock in the morning the dose should be taken about 7 o'clock the previous evening. The drug may be taken as the pill of aloes in a dose of 5 grains.

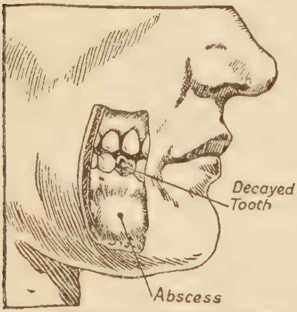
Aloes is a good remedy for chronic constipation, as it can be used in diminishing doses; thus it has been recommended that a pill containing 1 grain of the extract of aloes and 2 grains of iron sulphate be taken thrice daily for a week, twice during the next fortnight, and thereafter once daily. Besides the pill of aloes, there are the pill of aloes and asafoetida, pill of aloes and myrrh, and pill of aloes and iron, the dose of each being 4 to 8 grains. Aloes is also found in the colocynth pills and in the compound rhubarb pill. *See* Cathartic; Constipation.

ALOPECIA. *See* Baldness.

ALTERATIVE. Drugs which improve the nutrition of the tissues and act as general tonics to the body, though we cannot say how they do it, are known as alteratives. They include arsenic, sulphur, phosphorus, the iodides, some preparations of mercury, sarsaparilla (possibly), guaiacum and colchicum, etc.

ALUM. Alum is a crystalline substance which is often valuable in medicine. It is an astringent, and is useful as a gargle in cases of sore throat. The strength in which it should be used is about as much as will lie on a sixpence to two tablespoonsful of warm water. Glycerin of alum may be painted on enlarged tonsils or over the back of the throat, but the mouth should be rinsed quickly, as alum may injure the teeth. Powdered alum will often arrest bleeding, such as occurs from piles, from cuts inflicted during shaving, or from the gums or the nose. Alum very rapidly and certainly causes vomiting when given in large doses, say a teaspoonful of the powder in water or syrup every quarter of an hour. It is one of the few drugs which cause vomiting without causing depression, and hence it is of value in the treatment of children. For this reason, and also because it is so often found ready to hand, alum may be of signal use if freely administered in urgent cases of poisoning. A lotion consisting of a teaspoonful of alum dissolved in a pint of warm water may be injected in leucorrhoea or "whites." *See* Antidote; Poisoning.

ALVEOLUS. The socket in which a tooth is fixed is known as an alveolus; hence an abscess occurring in one of these sockets is called an alveolar abscess, or, more commonly, a gumboil. It should be opened as soon as possible, or an ugly scar may be left on the surface of the cheek or neck by the pus or matter burrowing through. While the abscess is discharging, the mouth should be kept clean by the frequent use of a mouth wash, for instance, compound solution of thymol B.P.C., or hydrogen peroxide solution, a dessertspoonful of either in two tablespoonsful of warm water. After a gumboil a dentist should attend to the offending tooth or teeth. *See* Gum.



ALVEOLUS. Alveolar abscess

AMBLYOPIA. This term is used to indicate in general all forms of defective or weak vision that are not due to errors of refraction or to gross changes in the structure of the eye. The kind of weakness that consists in inability to use the eyes for long is called asthenopia (q.v.).

AMBRINE. A waxy preparation, known as ambrine, is used in the treatment of burns, frostbite, chilblains, ulcers or whenever it is desirable to cover a surface with a protective layer. It is painless in its application, and as, unlike collodion, it does not adhere closely to a broken skin surface, it is easy to remove when the parts are again dressed, and discharges from the wound are able to make their way out at the margin of the dressing.

For use it should be melted in a water bath, and allowed to cool a little before applying. It is dabbed on with a camel-hair brush. A thin layer of absorbent cotton wool is applied as soon as the ambrine is on, and should overlap the edge of the latter all round. Over this is placed a layer or two of gauze. The dressing should not be left on for longer than 24 hours in the first few days, but it may be left for 48 hours when the discharge becomes less. The makers of ambrine supply a water bath for convenience in melting it, and they also supply candles of the material for use when the surface to be covered is small. *See* Bandage; Burn; Chilblain; Dressing; Ulcer, etc.

AMENORRHOEA. The absence of the normal menstrual or monthly flow in women is called amenorrhoea. Physiological amenorrhoea occurs before puberty, after the change of life, and during pregnancy and lactation or nursing. Morbid amenorrhoea occurs in many diseases. When the flow fails to appear at the age when one would expect it to do so, there may be some congenital defect or malformation of the internal genital organs. The discharge may in some cases be actually produced but be prevented from leaving the body by a membrane closing the passage. In such event a small operation will be effective.

The flow may fail to appear from chill through getting the feet wet and cold a day or two before the expected period. Mental shock may cause it. It occurs in serious diseases and is common in consumption and in anaemia. In such cases the condition is obviously desirable, since it economises the patient's strength by averting the periodical loss of blood. The treatment will vary with the causes, so medical advice should be obtained. *See* Anaemia; Menstruation.

AMMONIA. Really a gas, ammonia is generally used in medicine dissolved in water, so that for practical purposes it is a colourless liquid. It makes one of the best applications to insect bites or stings. When applied to the skin, ammonia is an irritant and is very often used in liniments. It is contained in the old-fashioned liniment, oil of hartshorn, and in the liniment of camphor and ammonia, either of which may be used after sprains or in chest complaints. When taken internally or inhaled in gaseous form, ammonia is an exceedingly powerful and rapid stimulant. Hence it is extremely useful in the form of smelling salts in cases of fainting or sudden collapse from any cause.

Ammonium carbonate, dose 3 to 10 grains, is a valuable stimulant and is contained in sal volatile. It is often included in mixtures for chronic bronchitis. In doses of 8 to 10 grains it may act as an emetic and is to be preferred, as a rule, when it is desired to induce vomiting in elderly or debilitated persons. Ammonium chloride, dose 5 to 20 grains, also relieves cough when taken in a mixture, a lozenge, or as a vapour formed by mixing the vapours of ammonia and hydrochloric acid in a special inhaler.

Ammonium bromide, dose 5 to 30 grains, may often be used with advantage instead of potassium bromide, as it is less depressing. Ammonium benzoate, dose 5 to 15 grains, is frequently used as an antiseptic in chronic inflammation of the bladder; it also increases the flow of urine. Liquor ammonii acetatis, or solution of Mindererus, dose 2 to 6 drachms, is a simple and safe diaphoretic, and is much used for a common cold and other feverish affections. A wineglassful may have a sobering effect in drunkenness. Liquor ammonii citratis has the same actions and is given in the same doses. Strong ammonia is a corrosive poison, and the treatment is to give vinegar or lemon juice in water.

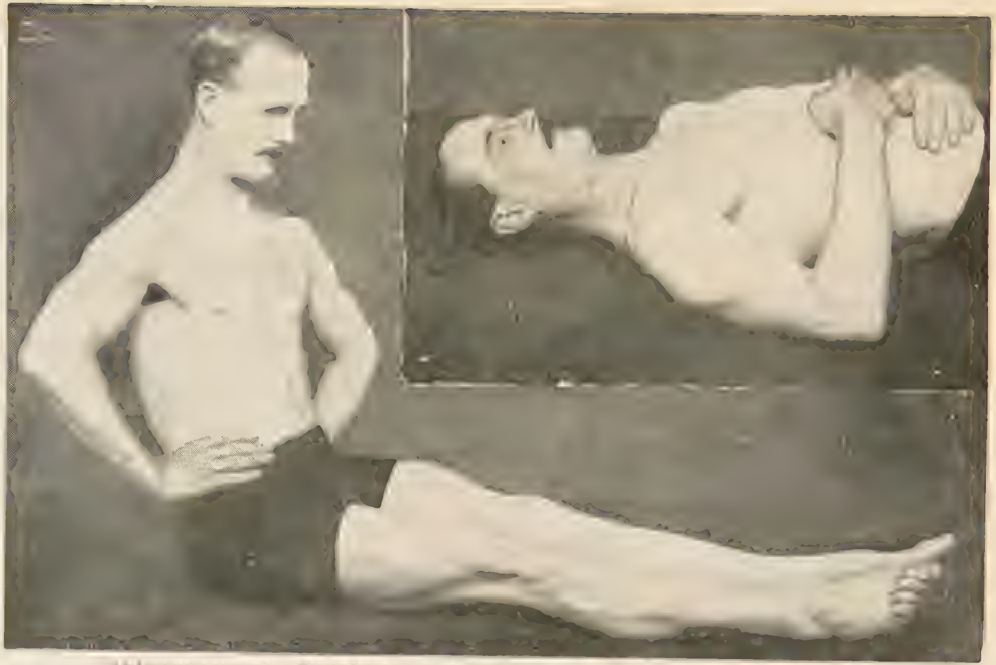
AMOEBA. In the lowest division of the animal kingdom there are minute one-celled organisms, specks of protoplasm or living matter, which in an active state are constantly changing their form and so have been called amoebae, from a Greek word meaning "changing." They are found both in the sea and in fresh water, and have an importance in medicine because species of the organism may be found in the body. In decayed teeth one may find the amoeba buccalis. The entamoeba coli may be present in the bowel and appear in the stools, but it gives rise to no trouble. Its importance is that it has to be distinguished from the entamoeba histolytica, the cause of amoebic dysentery and of an amoebic liver abscess. *See* Dysentery.

AMPUTATION. The removal of a limb or part of a limb is known as amputation. Amputation may be necessary in the case of severe injuries or of certain diseased conditions of the limb, for example, gangrene, malignant tumours, incurable ulcers, spreading infections, etc. The surgeon aims at securing as large a pad of soft tissues for the end of the stump as possible. Pain in the stump may be due to septic inflammation of the bone or of the nerves, or to a nerve ending being caught in the scar, and a further operation may be necessary. *See* Artificial Limb.

AMYL ALCOHOL. This form of alcohol, also known as fusel oil or potato spirit, has been used to adulterate whisky and to fabricate wines. It is extremely unwholesome.

AMYL NITRITE. A drug of very considerable importance, amyl nitrite is a fluid with the flavour of pear drops and a very penetrating and not unpleasant odour. It is very effective in treating the severest form of pain of the heart, angina pectoris (q.v.), and is also sometimes used in asthma, in haemoptysis, in epilepsy and for other purposes. It lowers the blood pressure by dilating the small arteries, and its use is followed by flushing of the face and body generally. Amyl nitrite is usually supplied in small glass capsules, which are crushed in a handkerchief, and when the handkerchief is held to the nose the drug is inhaled. *See* Ethyl Nitrite; Nitrite; Nitroglycerin.

AMYLOID DISEASE. In cases of long-standing suppuration, in advanced cases of tuberculosis and syphilis, and in rare instances of other diseases, a peculiar degeneration is found in some of the tissues of the body, notably the liver, spleen, kidneys, bowels and blood vessels. Other names are lardaceous disease and waxy disease, based on the fact that the material formed is translucent, like wax. *See* Degeneration; Intestine; Kidney; Liver, etc.



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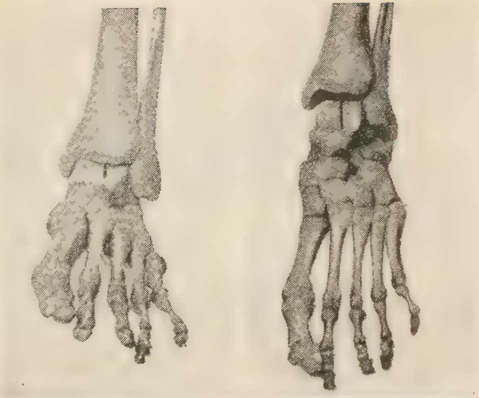
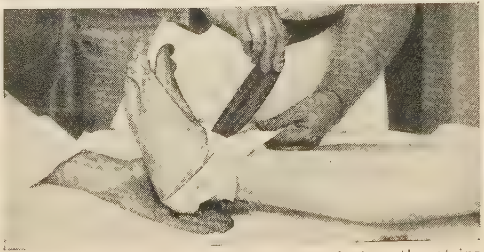
A SIMPLE EXERCISE FOR STRENGTHENING THE ABDOMEN

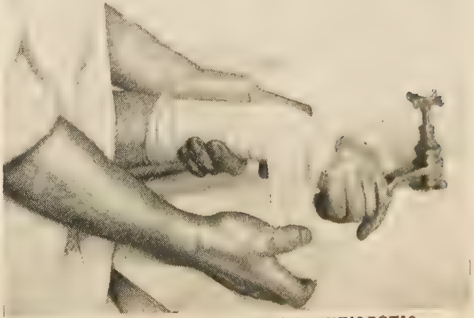


Left. Ankle. In low (left) and high heeled shoes, the latter causing displacement of the joint

Right. Antiseptic. Cleansing wound and surrounding surface with a swab dipped in lysol solution



Injured ankle strapped with adhesive plaster, the strips being applied to overlap each other



After careful drying the wound is covered with a layer of lint held in place by a bandage

TREATMENT OF AN INJURED ANKLE, AND THE USE OF AN ANTISEPTIC

ANAEMIA: POVERTY OF BLOOD

Causes and Treatment of the Main Primary and Secondary Forms

The various kinds and causes of anaemia are here enumerated, the difficulties of diagnosis explained, and methods of treatment outlined. See Blood: Diet; Iron; Leukaemia; etc.

The popular description of the conditions included under this heading, namely, bloodlessness, is a literal translation of the word anaemia; but, as a matter of fact, except for a short time after a considerable bleeding, anaemia does not mean a diminution in the quantity of blood in the body, but a deficiency of some of its important constituents.

Some degree of anaemia is found in debilitating diseases; for example, in consumption and other forms of tuberculosis, after fevers, in advanced kidney disease, cancer, malaria, syphilis, etc. It may be marked in cases of gastric or duodenal ulcer, from bleeding piles or excessive menstruation. It results also from faulty hygienic conditions of life and work, too little exercise in the open air, badly ventilated homes and workshops, under-feeding, as in a diet consisting mostly of bread and tea, septic mouths, etc.

The subjects of the disease become pale, and in particular there is blanching of the mucous membranes, observable easily in the gums and in the lining of the lower eyelids. The bodily and mental vigour become impaired, work and exercise are felt to overtax the strength, and exertion, as in climbing hills or going upstairs, easily produces breathlessness and perhaps palpitation. The poor blood supplied to the digestive organs soon leads to dyspepsia, which increases the drowsiness and irritability already resulting from the insufficiently nourished nervous system.

When the cause of anaemia has been obscure, it has been customary to call it primary anaemia. The two principal forms of this type are chlorosis and pernicious or Addisonian anaemia.

Chlorosis is generally found in girls, usually first between the ages of fifteen and twenty, though it may sometimes appear later. The name is derived from a Greek word meaning green, and in typical cases of the disease the face has a greenish-yellow tinge. The face is usually fairly plump and the skin clear. Sometimes the patient may have pink cheeks, due to flushing, and this is sometimes apt to conceal the fact of her bloodlessness. She is apt to have headache, easily to become giddy and to faint, but her first and most characteristic complaint is breathlessness on exertion. The monthly periods may become scanty and irregular, or may cease altogether.

Generally the appetite is poor, though some of these girls eat well and are apt to become stout. The patient may, however, develop a fondness for highly spiced foods, such as pickles for the sake of the vinegar and perhaps for unusual things like raw oatmeal or dried tea leaves. The tongue is usually large, pale and flabby, and often shows the marks of the teeth along its edges. Constipation is the general rule.

If an examination of the blood be made it will be found that the red blood cells are fewer than they should be, but the characteristic feature of the blood in this disease is that the red blood cells show a marked deficiency in their content of red colouring matter or haemoglobin, an organic compound of iron. It is in virtue of their containing this substance that the red blood cells can take up oxygen in the lungs for the use of the body.

As to its causes, it is significant that chlorosis has become a relatively uncommon disease in recent years, and that this remarkable diminution has coincided with an increase of open-air exercise amongst girls and the consequent adoption of a more natural type of clothing, in particular the disuse of tight corsets.

There is scarcely any disease more satisfactory to treat than this. If proper care is taken every case without exception should be easily and completely cured, though it is often apt to recur. All cases should be treated by as much sunlight and fresh air as can be obtained. It is also very important that the girl should get rest, and when the circulation is weak and the ankles are swollen she should be sent to bed for a week or two. She should be well fed, though the diet at first may have to be light, but plenty of milk should be given and she should take meat. No form of alcohol should be given. The notion that claret and other red wines make blood is quite incorrect.

The bowels must be carefully attended to. Constipation is often relieved when the patient is taking enough iron, but laxatives may be necessary and aloes or cascara sagrada are suitable.

The essential part of the treatment is to give iron in some form and in sufficient quantity. Blaud's pills or tablets, or capsules corresponding to these, provide a convenient preparation. It is usual to begin with one three times a day and gradually increase by one a day until four are being taken thrice daily. The doses are taken after the three main meals. There will be a quick response, and if this is not so when pills are used, it may be that they are not fresh and are passing through the bowel unchanged. This can easily be verified by an examination of the stools. Iron may also be given in liquid form, as in the following prescription:

Sulphate of iron	16 grains
Magnesium sulphate	1 ounce
Dilute sulphuric acid	1 drachm
Peppermint water	to make 8 ounces

Dose: a tablespoonful in a glass of water three times a day after meals.

When using liquid preparations of iron it is desirable for the sake of the teeth to rinse the mouth out immediately after taking the dose, or the medicine may be sucked through a glass tube.

In whatever form iron is taken it should be continued for at least two months before a cure can be certain, and in spite of the fact that the patient has now a sense of well-being. Although she feels well her blood has not regained its normal state, and there will be a relapse if the treatment is too soon interrupted. If symptoms of indigestion appear when taking a preparation of iron, another may be tried, for example, a liquid form instead of the pills, or the iron may be stopped for a few days, and one or two tablets of bismuth and soda taken thrice daily, after which iron will be resumed, at first in half doses.

Pernicious anaemia, as contrasted with chlorosis, is more frequent in men, and usually after the age of 40, though it may occur in women. In this disease, which is very deadly, there is an active degeneration of the red blood cells themselves. Its predisposing cause would appear to be absorption of poison from a septic mouth or from the stomach and bowels, but it is considered that in addition to this there must be the liberation of another poison of obscure origin, which breaks down the blood cells. Examination of the blood shows that these cells are greatly reduced in number, perhaps 40 to 70 per cent below normal, while the colouring matter, instead of being decreased as in chlorosis, may be relatively increased. Many deformed red cells are seen and unusual cells are also present.

Subjects of the disease suffer from progressive weakness and increasing pallor of the mucous membranes and skin, the latter commonly assuming a lemon yellow tint. Sickness, vomiting and diarrhoea occur sooner or later, and some degree of fever, chiefly in the evening. Dropsy appears in the legs and elsewhere, and sometimes there is pain in the bones of the legs and other long bones.

The treatment must be supervised by a doctor, who should be called in without delay. Rest in bed on a light and easily digestible diet, attention to the bowels, thorough cleansing of the mouth by the use of antiseptic washes and the extraction of foul stumps, and the administration of bone marrow and arsenic, are the usual lines of treatment. Large doses of hydrochloric acid have also been given because it is found that the victims of pernicious anaemia lack this acid in the gastric juice. Treatment by feeding with about half a pound of liver, raw and cooked, each day, has now come into vogue, and the results much surpass anything that has hitherto obtained. The raw liver is given in sandwiches as a rule, or a reliable extract may be chosen.

Anaemia due to debilitating disease and faulty hygiene presents a similarity to chlorosis in that the haemoglobin is deficient, but at the same time the number of blood cells is greatly reduced, and some cases resemble the pernicious type.

Anaemia is a much more common complaint in children than most mothers realise, and may result from the child being cooped up and deprived of sufficient fresh air, sunshine and exercise. The diet is often at fault, consisting mainly of starchy food and tea, or it may be that the child has a foul mouth or septic tonsils.

All such possibilities should be considered in treatment. The diet should be plain and include meat, oatmeal, milk, vegetables, fresh fruit and fresh butter. The bowels should be kept regular. Iron may be given in the form of chemical food (compound syrup of iron phosphate B.P.C.), a fourth to one teaspoonful thrice daily. Cod liver oil is an excellent remedy. Plenty of exercise in the open air and a sufficiency of sleep are all-important.

ANAESTHESIA. Strictly speaking, anaesthesia means a loss of sensibility for touch, but it is used frequently when other forms of sensation are lost or impaired, for example, pain (analgesia) and heat or cold (temperature sense). It occurs in various diseases of the nervous system, for example, following apoplexy, locomotor ataxia, neuritis and functional conditions like hysteria. It is produced by the use of anaesthetics (q.v.). *See* Sensation.

ANAESTHETIC. Any drug used to produce insensibility to pain is an anaesthetic. General anaesthetics act on the brain and spinal cord, producing unconsciousness, insensibility to pain and other sensations and relaxation of muscles. In sufficient doses they also prevent and may diminish shock. They are used to prevent the pain of operations or in conditions like gallstone or renal colic, and to relieve local or general spasm, for example, convulsions. Volatile substances are generally used by inhalation, and the principal examples are chloroform, ether, ethyl chloride and nitrous oxide or laughing gas.

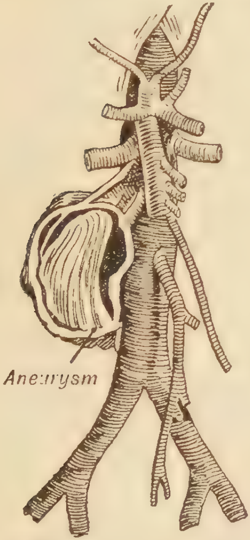
Local anaesthetics act on the nerve endings. Cocaine, eucaine and stovaine are examples; these are injected into or under the skin or mucous membrane. Another method is to chill the skin with an ethyl chloride spray. Local anaesthetics are also injected into the spinal canal and produce anaesthesia of large portions of the body so that abdominal operations, amputations, etc., can be satisfactorily performed while the patient remains conscious. *See* Inhalation.

ANALGESIA. Insensibility to pain is known as analgesia. Drugs which relieve pain by numbing the brain centres and sensory nerves are called analgesics, for example, opium, chloroform, antipyrine, phenacetin, belladonna, etc. *See* Anaesthesia.

ANASARCA. This name is applied to dropsy, or the accumulation of water in the body, when this accumulation occurs just under the skin and is thus easily visible. Its presence can be established by pressing firmly on the skin, preferably over a bone, when a depression will be felt which will take some time to fill up. *See* Ascites; Bright's Disease; Dropsy, etc.

ANEURYSM. An aneurysm is the swelling of an artery due to the stretching of its walls. In some cases the inner coat is broken through. It may be due to injury or weakening of the arterial walls by degenerative changes in chronic alcoholism, Bright's disease, syphilis and other diseases. Its most common site is the aorta, the great artery that runs immediately from the heart.

The symptoms depend on the position of the aneurysm and its size, many of them being caused by the pressure of the swelling on nerves and other structures. If in a leg or arm or anywhere near the surface, a rounded swelling may be felt which expands with each beat of the heart; there may be little or no pain. When it occurs in the chest, the patient may complain of shortness of breath, of pain, which may be continuous and severe, of huskiness of the voice, or of a hard metallic cough. Apart from injury, aneurysm occurs most often in men of middle age who have lived strenuously.



ANEURYSM. Showing one situated in the abdominal aorta. It contains several successive layers of blood clot

In some aneurysms a spontaneous cure results from the laying down of clot along the walls of the dilatation, but unless treated, and often in spite of this, the swelling usually increases in size until it bursts. This ending may be precipitated by blows or by sudden physical or emotional strain, and the subjects of the disease must be careful to avoid anything of the kind.

Any treatment must be supervised by a doctor. When the aneurysm is accessible—for example, in a limb—a speedy cure may be wrought by ligaturing the vessel, and electrolysis and other surgical methods may be adopted for aneurysms in which ligaturing is out of the question. General treatment consists of rest in bed and limitation of the diet in quality and quantity, so as to encourage the formation of clot. Alcohol, strong tea and coffee must be given up. People who are willing to regulate their lives carefully in all such matters may do much to prolong them. Among drugs, iodide of potassium has proved most useful. *See* Artery; Thrombosis; Tuffnell's Diet.

ANGINA. Derived from a Latin word meaning to strangle, the term angina is applied to certain disorders attended by a sensation of choking or suffocation. Ludwig's angina is an inflammation of the loose cellular tissue of the neck which occurs from infection arising in the mouth, frequently during the course of disorders such as scarlet fever. There is considerable swelling and the formation of pus, or matter. Early operation is necessary.

Vincent's angina is a disorder in which ulcers, covered with dirty grey membrane, form on the tonsils. A bacteriological examination must be made to exclude the presence of diphtheria. The patches are cleansed with solutions of potassium chlorate, but swabbing with tincture of iodine or another antiseptic, or even the use of a cautery, may be required. Inhalation of steam impregnated with Friar's balsam or eucalyptus oil helps to relieve the feeling of choking. *See* Larynx; Mouth; Tonsil.

ANGINA PECTORIS. Breast pang, or angina pectoris, consists in the sudden occurrence of severe pain under the breast bone, which may pass into the arms and elsewhere. The patient feels as if the chest were being powerfully compressed. He suffers from great anxiety and feels that he is about to die. A first attack may be fatal, but more often it passes off after a short time, though it tends to recur and the attacks increase in severity, while the intervals between them shorten. The disease is more common in men than in women, and occurs usually after middle life.

The most useful remedy is amyl nitrite, and no one who has suffered from an attack of angina pectoris should be without a supply of the small glass capsules containing the drug, which may be obtained from any chemist. A capsule is broken in a handkerchief, and the contents are inhaled. The doctor should be summoned at once, and meanwhile the patient is placed in the position which is easiest for him; a hot-water bag may be placed over the heart and he may be given sips of brandy and hot water.

After an attack the greatest care must be taken to avoid physical strain. The patient must not climb hills, rush to catch a train, try to walk against a strong wind, or do anything similar. He must also avoid mental and emotional strain. A fit of anger may prove fatal to him. His diet should be plain, with a great reduction in starchy foods, and the meals should be moderate in amount. If alcohol and tobacco are taken at all it should be very moderately, and so also with tea and coffee. The bowels should be well regulated.

False Angina Pectoris. Not every pain in the region of the heart develops into the disease first described; in fact, in the great majority of cases it does not, and to cases which have a superficial resemblance to it, the name false and pseudo angina pectoris is given. These roughly comprise two main groups: first, those resulting from neurasthenia, hysteria, or other nervous conditions, and second, those due to the excessive use of tobacco, tea, coffee, and other drugs.

While the pain, as in the other condition, comes on suddenly and the patient is pale and possibly covered with a clammy sweat, the stillness which characterises the sufferer from angina pectoris is replaced by great restlessness. The patient throws himself about or may even move about. He pants for air and may wish to get to an open window. The diagnosis must be made by the doctor, however, and he should be sent for without loss of time.

For immediate treatment a teaspoonful of sal volatile in a wineglass of water, or sips of very hot water, should be given. A hot-water bag may be applied over the heart, and sometimes a large mustard plaster is very efficacious. Other sufferers get relief from the application of an ice-bag. The underlying cause will demand investigation and neurasthenia or hysteria will be dealt with appropriately. Where tea, coffee, or tobacco are suspected as being responsible, they must, of course, be given up. *See* Amyl Nitrite ; Heart ; Hysteria ; Neurasthenia.

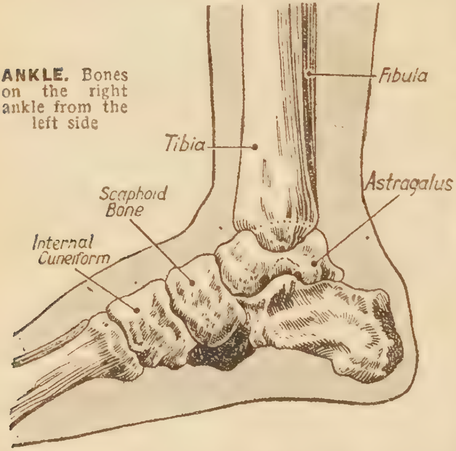
ANGIOMA. This is the technical name for a tumour or swelling which consists of a mass of any kind of blood-vessel. Perhaps the commonest kind of angioma is that called a birthmark (q.v.).

ANISE. The preparations of anise are derived from the dried fruits of anise plants, and owe their properties to the volatile oil of anise, the dose of which is ½ to 3 minims. Other preparations are the water of anise, ½ to 1 ounce (a teaspoonful for a child of one year) and the spirit, 5 to 20 minims. Anise may be used for flatulence and colic, the water being a convenient remedy for children. The drug is included in many cough preparations, as it helps in the expulsion of sputum from the bronchial tubes. *See* Carminative.

ANKLE. The ankle joint is of the hinge variety, normally permitting of two movements only, namely, elevation of the fore part of the foot (dorsiflexion) and its depression (plantarflexion). The main ligaments attaching the foot to the lower ends of the leg bones are the internal and external lateral ligaments. It should be possible to dorsiflex the foot so that the angle it makes with the leg is less than a right angle. Walking is more or less impeded, when, as the result of injury, the ankle joint is ankylosed, or fixed with the foot at a greater than a right angle, and also in cases of foot drop.

The ankle joint is constantly subjected to considerable, or sudden, strain, and it is frequently sprained. This is caused by a twisting movement of the foot, which tears the ligaments, and is sometimes due to the wearing of high heels and the consequently abnormal position of the bones. Bleeding results, and is responsible for the discoloration which ensues, while the ankle swells up and becomes hot and painful. Movement at the joint is fairly full, but causes much pain. When greater force has been applied to the parts, the tips of the lower ends of the tibia and fibula to which the ligaments are attached may be torn. Considerable force may cause displacement of the foot. When, as is most frequently the case, the foot is displaced outwards, it usually results in a Pott's fracture, that is to say, fracture of the fibula about three inches above the tip at the lower end of the external prominence of the ankle. Other fractures and dislocations may also occur in this region.

A sprain is treated by placing the limb at rest, the foot being elevated on a pillow. Cloths wrung out of cold water are applied to the ankle in the first instance, in order to limit bleeding and afford ease. Bleeding may be limited by maintaining pressure on the ankle, and if possible the boot should be kept on and may be supplemented by a bandage applied over it, or a flannel bandage may be applied firmly and evenly to the naked foot. Later on, hot fomentations or bran poultices may be used if they are found to be more comfortable.



ANKLE. Bones on the right ankle from the left side

For fracture or dislocation, if the patient has to be removed before being seen by a doctor, the foot is placed as far as possible in its correct position by gently pulling on it, and well padded splints are then applied to the outer and inner sides of the leg in order to fix the ankle. The legs are then tied together and placed on a pillow or cushion. A bed cradle, or similar contrivance, should be used to keep the weight of the bedclothes off the toes. The reduction of a dislocation or the setting of a fracture should be left to the doctor, as unskilled handling may do much harm.

When the sprain is slight the patient may be able to get about after two days, and in all cases, after the acute symptoms have lessened, perhaps in three or four days, the part should be massaged, and as the swelling subsides gentle movements should be performed. These, to begin with, are passive, that is, they are done by the nurse, and then the patient is encouraged to do them for himself. Such after-treatment is very necessary for the avoidance of subsequent stiffness in the joint and it may avert unpleasant consequences.

The ankle joint may become affected by tuberculosis. A swelling develops round the ankle, beginning usually in front, and the foot is held with the toes pointing downwards. The foot is put up in correct position at rest, and general anti-tuberculosis treatment adopted.

CARE OF THE ANKLES. Choice of footwear is important to ankle slimness. Heels of more than 1 to 1½ in. in height should not be worn for walking. High heels, by forcing the foot into an unnatural position, strain the flexibility of the ankle joint (Plate 2). Weak ankles are subject to swelling, and to remedy this condition remove shoes and stockings on returning home, apply cold compress to the joint and then, lying down, raise the foot on a cushion. Afterwards lightly massage the ankle and apply methlyated spirit. Heels of shoes should be repaired at the first sign of crookedness.

Anaemia may be responsible for swelled ankles ; or, in children, they may accompany a tendency to flat feet, and are a sign of general debility. Sunshine, fresh air and a bone-and-muscle-building diet are of importance. Paddling in the sea during the summer holidays is beneficial, as salt water has tonic properties.

Skipping and dancing barefooted or in flat-heeled shoes strengthen the ankles, and the following simple exercise imparts flexibility.

Stand with feet close together, toes as well as heels touching, knees braced back and the balance on the balls of the feet. Raise the body on to the toes and hold the position for a moment, then lower the heels. Repeat short series of the exercise several times during the day when convenient to discard heeled shoes.

The following exercises (which are illustrated in Plate 4) are very effective in improving the ankles and imparting flexibility to them :

(1) Stand with feet slightly apart and knees perfectly straight. Bend the body forward and clasp the right ankle with both hands, thumbs meeting over the instep. With firm pressure draw the hands up to the knees, relax the pressure as the hands go down again to the ankle, but do not remove them from the leg. Repeat several times on the right and then on the left leg.

(2) Lie flat on the back and stretch out right leg and foot with toes as near the floor as possible. Then, without bending the knee, let the foot come back till it is at right angles with the floor and leg. Hold the position for a moment, stretching the heel and back of the ankle, and then straighten the foot again, stretching the front of the ankle. Repeat several times with the right foot, then with the left, and then with both feet together. *See* Dislocation ; Foot ; Foot Drop ; Fracture ; Joint ; Massage ; Sprain ; Tuberculosis.

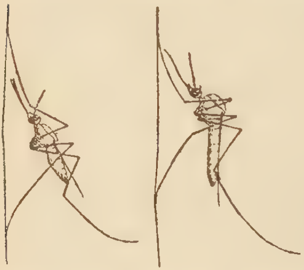
ANKYLOSIS. This name is applied to stiffness of the joints, and may result from inflammation in or about the joints and from other causes. If the bones forming the joint have united we get bony ankylosis, permitting of no movement, but if the stiffness is due to the soft parts, the formation of fibrous bands or contraction of ligaments, etc., it is fibrous ankylosis, and a certain amount of movement may be present.

When it is evident that ankylosis is going to occur in a joint, an attempt is made to secure this in the very best position for function. These positions are described under the heading Joint (q.v.).

ANKYLOSTOMIASIS. This disease is due to a species of small worm called the ankylostoma, or hook-worm. It is not uncommonly found in miners; hence its synonym, miner's anaemia. It is also called brickmaker's disease and tunnel disease. The eggs are discharged in the stools of an infected person, and the larvae, when hatched out, get into water.

Infection generally takes place through the skin. The parasites make their way into the veins and are carried to the lungs, where they escape into the bronchial tubes and thence into the gullet and stomach. At other times the parasites may be taken into the body in drinking-water. The mature forms of the worm have hooked teeth by which they attach themselves to the walls of the duodenum and jejunum, the upper parts of the small gut, and from which they suck blood. This leads to anaemia, which may be very severe. Where the disease exists, drinking-water should be filtered. Treatment consists in giving drugs to kill the worms.

ANOPHELES. Some of the mosquitoes or gnats are known to be carriers of certain diseases, and the anopheles is the genus which carries malaria. Like other mosquitoes, it breeds principally in marshy districts, but may do so on stagnant water anywhere, so that pools of water or fire buckets or other vessels containing water in the neighbourhood of dwellings are always dangerous in malarious districts. The adult of the species which is the common malaria carrier, has three or four black marks along or near the front borders of the wings, but another distinction is that when resting the insect cocks the hind part of its body high in the air. On the other hand, the culex mosquito, which is very common, remains with its body parallel to the surface on which it rests, or it may be somewhat depressed.



ANOPHELES. Anopheles (left) and culex in resting position

The female insect lays 40 to 400 eggs on the surface of the water. These may be single, but more commonly they adhere together as boat-shaped rafts. The larvae of the anopheles have to be parallel to the surface of the water, but those of the culex hang head downwards. The measures to be taken against mosquitoes are detailed under that heading. *See* Bite; Malaria; Mosquito; Tropical Hygiene.

ANT BITE. *See* Bite.

ANTHELMINTIC. Any drug that kills intestinal worms is called by this name. Examples are oil of male fern, santonin, thymol and turpentine. *See* Worms.

ANTHRAX. A very important disease which often occurs amongst the lower animals, anthrax is sometimes communicated to man by contact with the hides or skins of infected animals. Hence it is popularly known as woolsorters' disease. It is due to a special germ or microbe called the anthrax bacillus. If the bacillus gains entry to the skin it is apt to cause a very severe and dangerous swelling which is usually called malignant pustule, and requires the most energetic and early surgical treatment. On the other hand, if a workman, whilst engaged in handling hides that are infested with the anthrax bacillus, inhales some of the bacilli, he develops a still more serious kind of anthrax which almost invariably proves fatal. The microbes invade the blood (anthracaemia) and the blood poisoning is accompanied by a form of pneumonia. This bacillus, like all others, can be killed by processes of disinfection. Anthrax has been contracted from shaving brushes imported from abroad.

ANTI-ACID or ANTACID. This name is given to drugs which relieve acidity, for example, sodium bicarbonate, or liquorice.

ANTIBODY. The entrance of microbes into the body provokes the living tissues to produce protective substances which are collectively known as antibodies. They are of various kinds and their functions differ, but all are directed to destroying the invaders and neutralising the poisons produced. The substances responsible for dealing with the poisons are known as antitoxins; the other antibodies produce clumping of the microbes, or render the latter an easier prey for the cells (phagocytes) which eat up microbes, or break down the protoplasmic substance of which bacteria are composed.

When a person or animal is immune to an infectious disease it means that the blood contains the antibodies which deal with the microbe causing the disease. In treatment by antitoxins and vaccines we seek to imitate the natural defensive mechanism. *See* Immunity.

ANTIDOTE. A substance which may be used to neutralise a poison or counteract its effects is known as an antidote. It may act by converting the poison into a harmless substance, as when chalk, given as an antidote for oil of vitriol, forms with the latter the insoluble sulphate of lime. The tannic acid in strong tea has the same effect on morphine and other alkaloids, forming with them insoluble tannates. Coffee acts as an antidote in opium poisoning by combating the narcotic action of the latter. The main poisons and their appropriate antidotes are given in the accompanying table. *See* Poisoning.

COMMON POISONS GROUPED ACCORDING TO THEIR ANTIDOTES.

POISON	ANTIDOTE
Sulphuric acid (oil of vitriol)	Alkalies: magnesia; chalk; whitening; plaster from the wall or ceiling, one or two tablespoonsful ground and mixed with water. For all except oxalic acid, bicarbonate of soda, or weak washing soda solution, or weak ammonia.
Hydrochloric acid (spirit of salt)	
Nitric acid (aqua fortis)	
Oxalic acid (salt of sorrel or lemon)	
Washing soda	Acids: two or three tablespoonsful of vinegar, lemon or lime juice in water.
Caustic soda	
Caustic potash (pearl ash)	
Ammonia (spirit of hartshorn)	
Carbolic acid	Epsom salts.
Creosote	
Corrosive sublimate (perchloride of mercury)	White of egg.
Phosphorus (match heads, rat poison)	Oil of turpentine; copper sulphate; these should be given by the doctor.
Iodine	Weak solution of washing soda; starch.
Arsenic (rat poison, weed killer, Fowler's solution)	Dialysed iron, two tablespoonsful in half a glass of water, or calcined magnesia freely mixed with water.
Antimony (tartar emetic, antimonial wine)	Strong warm tea.
Sugar of lead	Epsom salts.
Copper (bluestone, verdigris)	White of egg.
Poisonous fungi	Atropine given by the doctor
Hydrocyanic or prussic acid, cherry laurel water, oil of bitter almonds, cyanide of potassium	If unconscious, inhalation of ammonia; otherwise spirits of sal volatile freely.
Opium (laudanum, morphia, paregoric, chlorodyne, Dover's powder, soothing syrups)	A small pinch of permanganate of potash crystals thoroughly dissolved in half a tumbler of warm water. Strong coffee by the mouth, or half a pint given as an enema. Strong warm tea.
Deadly nightshade, belladonna (atropine, liniment of belladonna)	Strong warm tea.
Hyoscyamus (henbane)	
Black nightshade	
Woody nightshade (bittersweet)	
Alcohol	Hot strong coffee; sal volatile.

Cocaine	Stimulants: whisky or brandy; hot strong coffee; sal volatile.
Ether	
Chloroform	
Chloral	
Nitrobenzene (spirit of mirbane)	
Phenacetin, antipyrine, exalgen, antifebrin, headache powders	
Strychnine (nux vomica, Easton's syrup)	Strong warm tea.
Digitalis (foxglove)	Sal volatile; strong warm tea.
Aconite (monkshood, wolfsbane)	
Tobacco	

ANTIFEBRIN. *See* Acetanilide.

ANTIMONY. Preparations of antimony are used in the treatment of certain parasitic diseases, namely, leishmaniasis, or infection by some species of Leishman-Donovan body, as in Baghdad or oriental sore; infection by trypanosomes, as in African sleeping sickness; bilharzia disease, and others.

POISONING BY ANTIMONY. Preparations of antimony in large doses act as irritant poisons, causing violent vomiting and diarrhoea and great depression of the heart. In cases of poisoning, if vomiting has not set in it should be induced by an emetic of a tablespoonful of mustard in half a glass of water. Strong, warm tea should then be given freely, and later white of egg and milk. The patient should be kept warm and lying down.

ANTIPARASITIC or PARASITICIDE. This is a drug that kills parasites, and the term is usually applied to those which kill parasites in the skin. All antiseptics (q.v.) are more or less useful for this purpose.

ANTIPYRETIC. Any drug or method of treatment which lowers the temperature is an antipyretic, a word derived from the Greek pur, fire. Quinine, salicin, and the coal-tar derivatives, phenacetin, antipyrine, acetanilide, and other drugs have this effect, but there is much less tendency now to use them for this purpose, and especially the coal-tar products, on account of the depression produced. Fever of moderate degree can be controlled by keeping the skin active, by giving liquids freely and perhaps remedies like sweet spirits of nitre and spirit of Mindererus and by tepid or cold sponging. *See* Fever.

ANTISCORBUTIC. Scurvy or scorbutus is due to an absence from the food or a deficiency of a vitamin or accessory food factor known as "water soluble C." Substances which contain this vitamin, and thus may be given to prevent or cure scurvy, are known as antiscorbutics. Of these orange and lemon juice are perhaps the best. Bottled lime juice is not now believed to have an antiscorbutic effect. *See* Scurvy.

ANTISEPTIC. Any substance which hinders the growth and activities of the microbes which produce putrefaction is an antiseptic. It is a matter of practical importance to distinguish between an agent which acts as an antiseptic and one which is a disinfectant or deodorant. A disinfectant kills the microbes which produce communicable diseases, for example, scarlet fever, and a deodorant destroys or covers disagreeable smells. Carbolic acid, if used in sufficient strength and for a sufficient length of time, will disinfect, but when used as an antiseptic it must be in greater dilution, or it will injure or destroy the body tissues. Eau de Cologne and the fumes of tobacco or of brown paper are sometimes used as deodorants, but, of course, they exert neither a destructive nor a restraining effect on microbes. Chloride of lime and similar preparations can be used for all three purposes.

In rendering first aid in the case of accidental wounds, and in dealing with suppurating or dirty wounds, antiseptics are necessary. Much is accomplished if the person who handles the wound cleanses his hands thoroughly with soap and water, washes the wound with clean water which has been boiled, and covers it up with a clean bit of linen, but the use of an antiseptic is desirable, and some such should be available in houses and workshops. Some of the commonest antiseptics and the method of their use are given below:

Perchloride of Mercury (corrosive sublimate) and *Biniodide of Mercury*. Solutions in water in a strength of 1 in 2,000 for wounds to 1 in 10,000 for an eye lotion. These preparations are extremely poisonous, and if obtained from the chemist as a lotion are coloured in order to prevent their being mistaken for and drunk as water. They may be obtained in coloured tablets, and this is very convenient, as it is easy from the directions accompanying the tablet to make solutions of the required strength. Corrosive sublimate should not be brought into contact with metal instruments, as it destroys them.

Carbolic Acid. In water, 1 part in 20, 40 or 60. In mixing, the water should be hot. If a wound is to be covered by gutta-percha tissue or oiled silk, the weaker solutions only should be used to moisten the dressing.

Tincture of Iodine. This can be painted on, the sharp smarting produced when applied to broken skin quickly passing off; or it may be used as a lotion, a teaspoonful to a pint of water. This makes a useful vaginal douche.

Potassium Permanganate. Dissolve sufficient crystals in the water to produce a light port wine tint, or obtain from the chemist solution of potassium permanganate B.P. and use a tablespoonful to a pint of water. When wounds or ulcers are foul-smelling this is very effective. Weak solutions (pink) are used as injections and lotions in gonorrhoeal affections.

Hydrogen Peroxide Solution. Diluted with five parts of water, this makes a good mouth wash, and is used in pyorrhoea. The compound solution of thymol B.P.C. also makes a good mouth wash or gargle, and can be used for a nasal douche. It is diluted with 3 or 4 parts of water.

Boracic Acid. A saturated solution is used, which is obtained by dissolving in hot water as much of the powder as can be taken up and pouring off the clear liquid after cooling. This will serve as a lotion, gargle or mouth wash. For an eye wash dilute the above with 5 parts of warm water. Boracic acid powder may also be dusted over wounds.

Iodoform. A yellow powder with a somewhat disagreeable smell. It is chiefly used for tubercular affections or venereal sores. As a dusting powder for sores it may be mixed with 4 parts of boracic acid powder.

Cresol Soap Solution or *Lysol.* A teaspoonful in a pint of warm water.

Eusol and Dakin's Solutions. These are hypochlorite solutions, and are good also as deodorants. The latter rarely irritate.

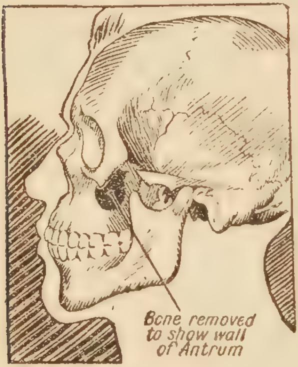
There are also many reliable proprietary antiseptics.

Antiseptics are of value internally in gastric fermentation, diarrhoea, enteric fever, dysentery, and other affections, but should only be used under the supervision of a doctor. *See* Benzoic Acid ; Chloride of Lime ; Corrosive Sublimate ; Creosote ; Cresol ; Disinfectant ; Dressing ; Formalin ; Iodine ; Iodoform ; Manganese ; Mercury ; Sterilisation ; Wound.

ANTISPASMODIC. As the name suggests, antispasmodics are drugs which relieve spasm or a sudden contraction of muscle fibres. They include aromatic spirit of ammonia, or sal volatile, and other carminatives, amyl nitrite, belladonna, bromides, chloroform, hyoscyamus, opium, valerian, etc. The application of warmth has often the same effect, as when a hot-water bag or a fomentation is applied to the abdomen to relieve colic. In spasm of the arteries, as in angina pectoris, the inhalation of amyl nitrite may relieve the spasm very greatly ; stramonium and belladonna are useful in asthma, the bromides in preventing epileptic fits, and valerian in hysteria.

ANTITOXIN. Among the defensive measures undertaken by the living tissues of the body against microbic invasion is the formation of an antitoxin, that is, a substance which neutralises the toxin or poison produced by the microbe. This action resembles the neutralisation of an acid by an alkali, but differs in this respect, that whereas any alkali will neutralise any acid, the antitoxin for any disease only neutralises the toxin of that disease ; the antitoxin of diphtheria is thus useless against the toxin of tetanus, and vice versa. Antitoxins are used either in cure or prevention. *See* Diphtheria ; Immunity ; Tetanus.

ANTRUM. The literal meaning of the word antrum is a cavern or cavity, and thus it is used to describe a large cavity in the upper jaw bone on either side, known as the antrum of Highmore, and a cavity in the mastoid process, the mastoid antrum. The former communicates with the cavity of the nose through a narrow opening, and when the antrum becomes infected from the nose, or perhaps more frequently from certain diseased upper teeth, pus has difficulty in draining away. Suppuration, or, as it is often called, empyema of the antrum, may cause pain in the jaw and swelling of the cheek. The condition is to be suspected if a discharge of offensive pus takes place into the nose when a person lies on one side of his head. The mastoid antrum communicates with the middle ear, from which it may become infected. *See* Ear.



ANTRUM. Cavity in upper jaw

ANUS. The external opening of the rectum, or lowest part of the large bowel, is called the anus. The diseases most commonly found in this region include piles, abscess, fistula, fissure, pruritus, and prolapse and stricture, which are discussed under these headings.

APERIENT. The milder purgatives are known as aperients or laxatives. Their effect is to produce one or two soft motions. The doses of those most commonly used are as follows:

Dry extract of cascara sagrada	2 to 8 grains in pills or tablets
Liquid extract of cascara sagrada	½ to 1 drachm
Aromatic syrup of cascara	½ to 2 drachms

This affords an agreeable way of taking cascara which will appeal to children; about a half-teaspoonful for a child of eight.

Castor oil	1 to 2 teaspoonsful

This is the best aperient during pregnancy in teaspoonful doses, repeated, if necessary. The taste may be concealed by an equal quantity of glycerin and some lemon juice.

Castor oil mixture	2 to 4 tablespoonsful
Flowers of sulphur	20 to 60 grains in molasses
Confection of sulphur	1 to 2 teaspoonsful
Milk of sulphur	20 to 60 grains in molasses
Sulphur lozenges	1 or 2 at bedtime
Compound liquorice powder	1 to 2 teaspoonsful
Syrup of figs	1 teaspoonful for children
Liquid paraffin	1 teaspoonful to 1 tablespoonful

Powder of magnesia or magnesia carbonate 5 to 30 grains, repeated doses; 30 to 60 grains as a single dose.

May be mixed in milk, plain water or soda-water.

Solution of magnesium citrate	5 to 10 ounces
Olive oil	1 to 2 tablespoonsful
Tamar indien lozenges	1, less or more

Useful for old people.

The more active purgatives, such as senna, rhubarb and aloes, act as aperients when given in sufficiently small doses. *See* Cathartic ; Constipation ; Diarrhoea.

APHASIA. The communication of our ideas to others implies, first, mental processes in which thoughts are shaped, things and qualities being correctly named and associated in the form of propositions ; and, secondly, mechanisms to reproduce these propositions whether by speech, writing or gesture. After an apoplectic seizure and in other brain diseases certain disorders of speech may be found, in which, although the mechanisms for reproduction are in order, they cannot be utilised properly or at all, because of some impairment of the intellectual processes. Aphasia is the name under which such disorders are grouped.

People who become aphasic are not always affected in the same way, and at least four varieties of the disease are recognized which are discriminated by their response to a series of tests. Sufferers from the first understand what is said to them, but in speaking and writing they have difficulty in expressing themselves, the pronunciation is defective and their vocabulary appears to be small ; the second variety pronounce words properly, but appear to have lost their knowledge of what written and spoken words stand for ; the third talk jargon, having a poor sense of the grammar and rhythm of sentences and of balance in the enunciation of words ; and the fourth, while they can read and write, tend to become confused, and if told to do something, do not appear to understand what the aim of the action is.

APHONIA. Loss of voice is termed aphonia. It is usually due to inflammation of the vocal chords, but sometimes it is due to hysteria. *See* Speech.

APOMORPHINE. This drug is derived from opium. It causes vomiting more quickly and certainly than any other known drug, and may thus, if at hand, be very useful in cases of poisoning. It is injected under the skin in doses of $\frac{1}{20}$ to $\frac{1}{10}$ of a grain, though it may also be given by the mouth.

APOPLEXY. When a person becomes suddenly unconscious from bleeding caused by rupture of an artery in the brain or from the blocking of such an artery, he is said to suffer from apoplexy. Cerebral haemorrhage is not common before middle life, when the effects of age are apparent in the arteries ; and, as strain is an important cause of these arterial changes, it occurs most often in men. The arteries tend to become more brittle with advancing years, but more so and more quickly in people who over-eat or who constantly take more alcohol than is good for them. Kidney disease, syphilis and lead poisoning cause thickening and degeneration of arteries and may precipitate a cerebral haemorrhage at an unusually early age.

Blocking of an artery, or embolism, is brought about by a clot or other foreign body which is carried to the brain by the blood stream. Any person with a diseased heart is liable to the accident, which may therefore occur in quite young persons. In old people with degenerate arteries the blood may clot in the arteries and apoplexy may result, but more usually the development of symptoms is gradual. An attack of apoplexy may follow physical or mental strain, from an increase in the blood pressure, but it may occur without apparent provocation, and may happen during sleep. It may prove fatal, either immediately or after the lapse of some hours or days, but this is not usual in first attacks, and the patient gradually becomes conscious, though paralysis of muscles on one side of the body and perhaps mental impairment or disturbances of speech will remain for some time and in some degree may persist indefinitely.

The word apoplexy is derived from a Greek one meaning to strike down or to stop, and describes exactly what takes place in the seizure. The patient suddenly loses consciousness and becomes completely helpless. His face may be pale, but more commonly is flushed, and the head and eyes may be turned to one side, generally that on which the brain has been damaged. The breathing is laboured and stertorous, the lips are blown out, and the cheeks flap with each expiration. The eyeballs are insensitive to touch and the pupils are contracted, one being bigger than the other. The bladder may be emptied and the bowels may move.

Those who witness such a seizure should have little difficulty in recognizing its nature, but, when, as sometimes happens, the victim of an attack is not seen until some time later, it may be necessary to distinguish the condition from some others. The pupils may be very small as in opium poisoning, and the flushed face and noisy breathing may suggest acute alcoholism. The latter impression may be heightened by the fact that the patient smells of alcohol.

An important sign of apoplexy, if it can be elicited, is paralysis of one side of the body. If the arms of the patient are lifted up one after the other and allowed to fall, it will be found that on one side the arm drops just like a dead thing, and the muscles of this limb will feel looser and more flaccid than those of the other. The doctor will have to make the diagnosis, of course, but it is necessary to emphasise the distinction between alcoholism and apoplexy, because it has sometimes been too readily assumed that a man was drunk when actually he was suffering from apoplexy, and he has been left to die in a police cell. Whenever there is the slightest doubt about it, the case should be treated as if it were apoplexy.

Unconsciousness usually passes off in three or four hours, but in cases of haemorrhage there is likely to be some mental confusion and perhaps a complaint of headache. In cases of embolism, consciousness is usually recovered earlier and more completely. If unconsciousness lasts longer than twelve hours the outlook is grave. The paralysis of the face and limbs usually improves, and also the speech if this has been impaired, but some time must elapse before one can form an opinion as to how complete the recovery will be. One attack is liable to be followed by others.

The treatment of an attack consists in laying the patient on his back or, if his breathing is especially difficult in this position, turned a little to one side. His head should be a little raised, and clothing about the neck and chest should be loosened.

The greatest gentleness must be exercised in handling the patient, and no one should be allowed to do more than this till a doctor comes. Lives have been lost through over-zealous helpers lifting up such cases, carrying them upstairs to bed and undressing them. Any but the slightest movements may further increase the escape of blood from the ruptured vessel. Hot-water bottles may be placed at the patient's feet and between his thighs, and if an ice-bag is available it may be placed on his head. While the patient is lying helpless in bed it will be necessary to prevent his bladder from going too long unemptied, and enemata may be required to clear the bowel. Should unconsciousness be prolonged, it may be necessary to feed the patient with nutrient enemata. While limbs remain paralysed their position should be changed frequently, to avoid their becoming flexed and stiff at the joint. Care must be taken to avoid the formation of bed-sores (q.v.).

When the patient begins to take nourishment this should be restricted at first to small quantities of milk and beaten-up eggs, and the advice of the doctor should be followed with regard to any increase in the diet. At no time should alcohol be given unless prescribed by the doctor. During convalescence the doctor may order massage or electrical treatment for the paralysed limbs. When the patient is up and about he must lead a quiet, retired life, free from worry and excitement. He should take gentle exercise daily. The diet should be plain and easily digested. Alcohol should be avoided, and if tobacco is used at all it must be in strict moderation. The skin should be kept active by warm baths followed by a rub down, and regularity of the bowels must be maintained, if necessary by the use of a simple aperient. *See* Artery; Embolism; Paralysis; Thrombosis.

APOTHECARIES' WEIGHTS AND MEASURES. In prescribing solid drugs doctors may order so many grains, or they may use the apothecaries' scale and symbols for quantities up to a drachm; in the case of larger quantities, 1 ounce and 1 pound, the avoirdupois scale is used. There is a material difference in the two scales for these quantities. In the Apothecaries' scale a pound consists of 12 ounces of 480 grains each, or in all 5,760 grains, while a pound avoirdupois consists of 16 ounces of 437.5 grains each, or in all 7000 grains. In describing liquids the apothecaries' measures are used for quantities up to an ounce and beyond this the imperial measures. The composite scales would therefore appear as follow:

Apothecaries'

Dry

20 grains (gr.) = 1 scruple (℈)
3 scruples = 1 drachm or dram (ʒ)

Wet

60 mimims (♏) = 1 fluid drachm or dram (ʒ)
8 fluid drachms = 1 fluid ounce (℥)

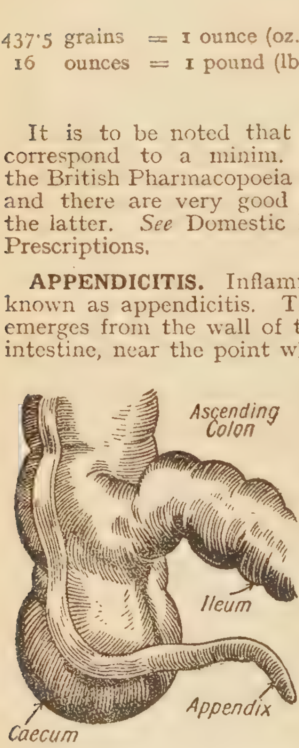
Imperial

437·5 grains = 1 ounce (oz.)
16 ounces = 1 pound (lb.)

20 fluid ounces = 1 pint
8 pints = 1 gallon

It is to be noted that a drop varies in size and does not correspond to a minim. The doses of drugs are given in the British Pharmacopoeia also according to the metric system, and there are very good reasons for the universal adoption of the latter. *See* Domestic Measures; Dose; Drug; Medicines; Prescriptions.

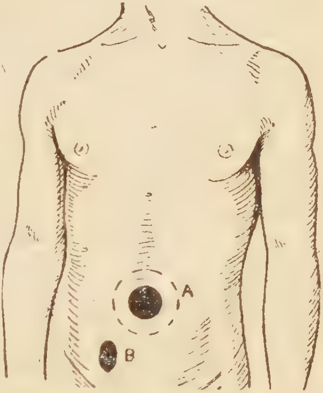
APPENDICITIS. Inflammation of the vermiform appendix is known as appendicitis. The appendix is a narrow tube which emerges from the wall of the caecum, or first part of the large intestine, near the point where the latter is joined by the small intestine. In an adult its average length is about 4 inches, and it is not very thick; hence its description as vermiform, which means worm-like. Appendicitis may occur at any age, but is commoner in young people and especially in males.



APPENDIX. How it is attached and opens into the caecum

The appendix communicates with the bowel, but is closed at the other end. Its lumen is narrow, and if there is a slight swelling of the lining at the entrance, or if the appendix is kinked, secretions may be imprisoned and decompose. The walls contain a large amount of lymphoid tissue similar to that of which the tonsils are composed, and this is readily liable to inflammatory swelling. Foreign bodies, such as grape seeds and fruit pips, are not found in the appendix so frequently as was at one time supposed, but what is found quite frequently is a little piece of hardened faeces, probably resulting from chronic constipation, and this may irritate the appendix lining or ulcerate into or even through the wall of the organ. Besides irritation produced by bodies of this kind, the tissues of the organ may be infected in such diseases as rheumatism or tuberculosis, and, of course, the appendix may share in catarrhal conditions affecting the adjoining bowel.

Whatever may be the cause of the inflammation, the lining or the whole organ swells and becomes painful. It is evident that the walls of the little tube are very vulnerable and allow microbes and their products a fairly ready access to the peritoneum, which covers the organ like the finger of a glove and is continuous with that lining the interior of the abdomen and covering the bowels and other organs. When infection reaches this membrane through the appendix it becomes inflamed, and lymph, a soft substance like colourless blood clot, forms on its surface. By means of this the appendix becomes glued to adjoining structures; it may even be entirely surrounded by a mass of matted tissue and thereby cut off from the general cavity of the abdomen. In other cases the inflamed appendix may become gangrenous, that is to say, its tissues die. Very often the infection is able to reach the general cavity, where it produces general peritonitis.



APPENDICITIS. Diagram indicating where pain is first felt in early stage of the disease. A. The neighbourhood of the navel, where it begins, then quickly moving to B

The symptoms of the disease in the first instance are nausea, sickness, a sense of pain around the navel, a rise of temperature, perhaps to 101° or 102°F, a quickened pulse and constipation. After some hours there is tenderness at a point to the right of and below the navel, and the muscles of the abdominal wall become rigid and resist any attempt to press in with the fingers. To ease the pain the patient often lies with the right leg bent up. These symptoms may indicate the earlier degrees of inflammation, but one cannot be sure of this, and the surgeon is not infrequently surprised to find the appendix gangrenous when the general condition of the patient has not appeared particularly serious. In general peritonitis the whole belly becomes swollen, hard and painful, and the general condition of the patient is much aggravated.

It is imperative that the patient be placed in the care o the surgeon at the earliest possible moment. Many cases have got better without operation, but a deplorable number of people lose their lives because operation has been delayed until too late.

For relief of pain till the doctor comes a hot-water bottle may be laid by the side of the patient, or an ice-bag may be applied to the part, and, as this should not press on the belly, it is suspended from a bed cradle (q.v.) placed under the bedclothes, so that the bag merely touches the patient.

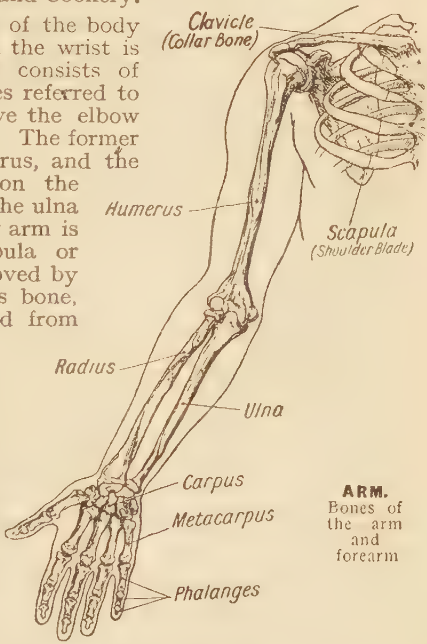
Dating from an attack of appendicitis perhaps so slight as to be overlooked, there may be a recurrence of attacks, and these also may be slight in character. When an attack has subsided, the exudate which has been mentioned above as forming on the peritoneal covering of the organ becomes converted into tough strings or bands, called adhesions, tethering the appendix to the body wall or to other organs. The result may be interference with the movements of the bowel and constipation or actual obstruction of the gut. Another result may be the production of dyspeptic symptoms which are not relieved till the general condition is dealt with, and in duodenal ulcer there is generally also associated appendix trouble.

In these cases the absence of signs in the neighbourhood of the appendix is far from negativing the reality of disease of this organ as a factor in producing the gastric symptoms ; in fact, it is probably found oftener without signs than with them. Some people have symptoms which suggest appendicitis and cause them a lot of worry, but which have nothing to do with the appendix. For example, the accumulation of gas or faeces in the caecum may cause considerable pain in the right lower abdomen, but this will be relieved by the passing of flatus or a motion. If, however, such a condition tends to persist, a doctor should certainly be consulted. *See* Constipation ; Peritonitis.

APPETITE. When the body requires nourishment there arises automatically the natural craving for food which we call appetite. It is this and the sight, taste and smell of food which start the flow of the gastric juices. The appetite may be affected psychically, and an ill-cooked and badly served meal may do much to reduce it, as may any depressing emotion.

To a certain extent appetite is a measure of the quantity, and a guide to the nature, of the food one should take ; what we fancy is likely to be good for us. But there are exceptions to this, as a poor appetite may not represent the needs of the body, but only be due to faulty hygiene, such as sedentary habits, too little exercise, or the abuse of tobacco, tea, alcohol or other drugs. On the other hand, a good appetite may be misleading, as in diabetics or in the case of a convalescent from enteric fever, when the satisfaction of his desire for particular articles of food is likely to produce haemorrhage or perforation of the bowel. In cases of duodenal ulcer the pain is usually worst when the patient is beginning to feel hungry ; this is sometimes called " hunger pain," and at first it is relieved by the taking of food. In acute fevers the appetite disappears, and in this instance it is desirable that it should, as the patient is not able to digest much, especially solid food. A poor appetite is also found in debilitating diseases.

In cases where personal habits are at fault the obvious thing to do is to correct the habit. However, something may be done to improve the appetite by the use of bitters, (q.v.). *See* Diet ; Digestion ; Eating ; Invalid Cookery.



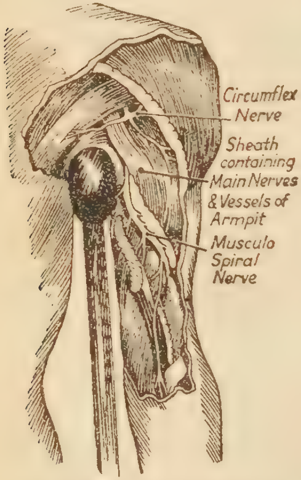
ARM. Bones of the arm and forearm

ARM. The upper limb of the body between the shoulder and the wrist is known as the arm, and consists of the upper arm (sometimes referred to simply as the arm) above the elbow and the forearm below it. The former has one bone, the humerus, and the latter two, the radius on the outer or thumb side and the ulna on the inner. The upper arm is jointed on to the scapula or shoulder blade, and is moved by muscles coming from this bone, from the collar bone and from the trunk.

The main artery of the limb, the brachial, runs on the inner side of the humerus in its upper half, but comes in front of the bone below this. In compressing the artery to stop bleeding it is necessary therefore to compress above the middle of the bone, and from within outwards. The inner seam of the coat roughly indicates the position ; the limb is grasped from behind and pressure applied by the four fingers. Three main nerves pass down the arm, the median, the ulnar, and the musculo-spiral. The latter winds round the back of the humerus, and is liable to be compressed when the back of the upper arm is pressed on a hard edge, for example, of the bed when one is asleep. This may result in wrist drop.

Care of the Arms. For improving the colour, texture and shape a simple night treatment is as follows : Rest one hand, palm downwards, on the edge of the bath and with a loofah or rubber friction glove on the other hand, stroke firmly in one sweep from fingers to shoulder, returning down the arm with a light touch. Repeat the movement several times, apply to under side of arm and then treat the other in the same way. Sponge with warm water and while wet spread over the skin enough toilet almond meal, first mixed to a stiff paste with extract of witch hazel, to cover hands and arms. Leave on till quite dry, then brush off and gently massage the arms with this cream :

Coconut oil, castor oil, sweet almond oil, each 2 oz. ; hydrous lanolin and white vaseline, each 3 oz. Melt together the coconut oil, lanolin, and white vaseline in a jar placed in hot `water, stir in the castor and almond oils, perfume, and allow the mixture to cool.



ARMPIT. Crutch paralysis induced by pressure on nerves

Should the arms be sore from exposure the cream only can be used without friction or massage for a few nights, smearing on thickly and leaving to soak in, covered by a pair of old long white gloves, with finger-tops cut off. Ugly elbows can be improved by massaging with the palm of the hand each time an emollient is used for arms or face.

A safety razor for the armpit is more sensible than the use of depilatories (hair removers), which sometimes cause irritation. *See* Artificial Limb ; Elbow ; Humerus ; Median Nerve ; Radius ; Shoulder ; Ulna ; Wrist.

ARMPIT. The axilla or armpit contains the large blood vessels and nerves supplying the arm, and is therefore a dangerous situation for a wound. Care has to be taken in the use of crutches and in applying splints that undue pressure is not made on the armpit, lest crutch palsy be the result. It also contains a number of lymphatic glands, which may become enlarged and inflamed from poisoned wounds on the arm, the hand or the breast. In addition to treatment of the wound, the arm should be rested in a sling. The glands also enlarge in chronic inflammation and in cancer of the breast, and must be removed with the latter for the extirpation of cancer.

Excessive sweating of the armpits is often met with in forms of debility. But copious sweating which sometimes occurs in the armpits when a person strips is usually due merely to chilling of the skin. The armpits should be washed daily with soap and water, and after drying may be dusted with a powder consisting of equal parts of boracic acid and starch or with this more elegant preparation :

Oil of rose geranium	6 minims
Salicylic acid powder	1 drachm
Zinc oleate powder	3 ounces
Starch powder	3 ounces

If necessary the hairs should be removed by shaving or by a depilatory. Eczema of the armpit responds well to an ointment of equal parts of diachylon plaster and soft paraffin. *See* Lymphatic System ; Shoulder.

ARNICA. This plant yields tincture of arnica, very popular as an external remedy for bruises and sprains. The remedy, however, probably owes all its virtues to the alcohol it contains. It may produce disagreeable rashes, and should never be used when the skin is broken. Other effective remedies are easily available which have none of its risks. *See* Bruise ; Sprain ; Tincture.

AROMATIC. This name is applied to substances which have a particular kind of pleasant odour. Many aromatics are used to flavour prescriptions, but in addition to this they act as carminatives, relieving flatulence and aiding digestion. They are also, nearly all powerful antiseptics. They include anise, camphor, cardamom, cinnamon, dill, ginger, peppermint, thymol, etc. *See* Carminative.

ARROWROOT. Cooked arrowroot makes a bland food for invalids. As it consists almost of pure starch, it must be supplemented by milk, eggs and other foods. To prepare it, mix a dessertspoonful of the powder with two tablespoonsful of milk or water and pour over it a half-pint of boiling milk or water. Stir briskly, then add a teaspoonful of sugar. If ordered, a teaspoonful of brandy or cream may also be added. *See* Invalid Cookery.

ARSENIC. The metal arsenic, which has important industrial uses, is often a valuable medicine in some of its various preparations. As it is highly poisonous, it should not be taken except under medical supervision. Fowler's solution, or liquor arsenicalis, is a favourite method of exhibiting the drug in medicine. Arsenic acts as an alterative (q.v.) and as a blood tonic. It is usefully employed in some forms of anaemia, either alone or in combination with iron, and is largely used in the anaemia and debility accompanying malaria. Chronic skin affections may be greatly benefited by its use, and it is added to bromide mixtures when there is a tendency to the development of a bromide acne. It finds another useful sphere in the treatment of some chronic nervous complaints, for example, disseminated sclerosis. Arsenic is a powerful remedy in destroying blood parasites, and one or other of its organic preparations is usually employed for the purpose; thus galyl has been largely given in malaria and trypanosomiasis, and salvarsan or some of its modifications in syphilis.

Poisoning by Arsenic. Should redness and smarting of the eyes, sneezing and running of the nose develop when arsenic is being taken, the medicine should not be continued without reference to the doctor. Acute poisoning by arsenic results in vomiting, severe diarrhoea, abdominal pain and great weakness. The stomach should be emptied by an emetic of a tablespoonful of mustard in a half-glass of water. Then an antidote should be given, dialysed iron if possible, in two-tablespoonful doses; or, if this is not available, large quantities of magnesia in milk or water. The white of two eggs beaten up in milk will follow. The patient should be kept warm in bed with hot-water bottles at his feet and by his side. Hot fomentations or a poultice on the abdomen will relieve pain and diarrhoea.

Chronic poisoning may occur in workers whose occupation involves the use of arsenic, for example, in the manufacture of aniline dyes. The earliest symptoms are those of irritation of the eyes and nose, with which there may be loss of appetite, nausea, vomiting and diarrhoea. Inflammation of the nerves, or neuritis, may lead to increased sensitiveness of the skin, weakness, and foot and wrist drop. The skin may become thickened and deeply pigmented.

Potassium iodide will probably be prescribed by the doctor to aid in the elimination of the poison from the system. The diet will have to be light, and tonics may be necessary. The time taken in recovery, and its completeness, will depend on the amount of arsenic which has been absorbed and on the extent and nature of the tissue changes which have resulted. *See* Anaemia; Poisoning; Salvarsan.

ARTERIO-SCLEROSIS. The literal meaning of arterio-sclerosis is hardening of the arteries, and this is what happens in the disease. Degenerative changes occur in the walls of the vessels which impair their elasticity, and a deposit occurs in the inner coat which narrows the lumen of the vessel. The vessels are weaker also and tend to rupture when exposed to strain, thus giving rise to aneurysm or haemorrhage. A change of this kind is apt to appear in the arteries after middle life, and in old age they may be more or less rigid tubes. In some people, as a part of their physical inheritance, the arteries may harden at an unusually early age. Increase in the blood pressure is an important cause, and, unfortunately, the blood pressure may be

ARTERIO-SCLEROSIS.
Lime deposit in artery

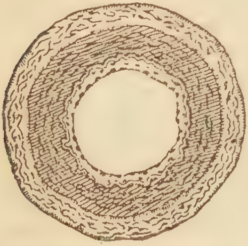
abnormally high for a long time, without giving any marked hint of its presence. Strenuous muscular toil is another cause, and a large number of cases are due to immoderation in eating and drinking, particularly in those who take insufficient outdoor exercise. Lead poisoning, syphilis and kidney disease are amongst other causes which should be mentioned. Arteriosclerosis may also give rise to kidney disease, and it may result in enlargement of the heart.

It gives rise to a large variety of symptoms, depending to some extent on the site of the vessels affected. Some of these are: giddiness, especially on altering one's position; headache; impairment of the power of attention; weakness or paralysis of muscles; coldness of the hands and feet; insomnia; noises in the head; shortness of breath and pain over the heart. The possibility of its occurrence should be borne in mind by those who have passed middle life and especially by those who live freely.

Whether the disease is to be cured or only moderated, if even that, depends upon the stage at which it is discovered and treated. Treatment involves a tranquil life, strict moderation in eating and drinking and in the use of tobacco, and attention to the bowels and to the activity of the skin. It is necessary for such people to keep in touch with their doctor. *See* Aneurysm; Angina Pectoris; Apoplexy; Artery; Endarteritis; Gangrene.

ARTERY. The blood vessels that carry blood from the heart are termed arteries. The blood in the pulmonary artery which is being pumped by the heart into the lungs is dark or impure blood, but with this exception the blood in an artery is always bright red from the presence of oxygen.

An artery has three coats: an inner smooth, elastic coat; a middle muscular; and an outer supporting coat, composed of connective tissue. The muscular coat is relatively thicker in the smaller arteries, and when it contracts and narrows the lumen of these vessels the resistance to the blood flow is, of course, increased and the blood pressure is raised. The contraction of this coat serves in arresting bleeding from a divided artery, the curling inwards of the elastic inner coat likewise contributing to this effect. *See* Aneurysm; Arteriosclerosis; Circulation of the Blood; Embolism; Endarteritis; Infarction; Pulse; Thrombosis.



ARTERY. Cross section showing the three coats

ARTHRITIS. When all the tissues of a joint are involved in inflammation, the term arthritis is used to describe the condition. Inflammation of the synovial membrane is known as synovitis.

Arthritis may be due to gout, to rheumatism, to tuberculosis, to injury and to many other causes. *See* Joint; Osteo-arthritis; Rheumatism; Rheumatoid Arthritis.

ARTIFICIAL LIMB. Strength, lightness and comfortable adaptation to the stump of the amputated limb are qualities not one of which can be dispensed with in an artificial limb. The mechanical construction should also be sound; the part nearer the body should be the heavier, in order to secure better balance; joints and locking parts should be secure yet work smoothly, and braces and straps should be fitted so as not to compress the chest and interfere with breathing.

Artificial limbs are to be had in great variety, and the advice of a surgeon should be taken as to the type suitable in a particular case, while a good maker should be asked to attend to the fitting. It is desirable to begin wearing a limb as soon as possible after the amputation in order to hasten a proper shaping of the stump and the restoration of bulk and tone to the muscles which move it. As a rule it will only be a temporary limb which will be suitable for the purpose.

When first worn, an artificial limb may prove irksome and tiring, but ease in wearing will increase with use. Persevering practice with movable fingers and tools may in time make an artificial arm a fair compensation for the lost one, although the initial awkwardness may appear to be an insuperable difficulty.

For heavy work a hook is the most suitable attachment for an arm, and should be fixed as near the end of the stump as possible; many ingenious tools and appliances are provided for taking food, writing and doing various kinds of light work; these, and hooks also, should be fitted to the limb by a spring attachment rather than by screwing.

A peg leg is more suitable than a full artificial limb for one who has to do much tramping over moist earth, as damp very quickly destroys the various types of artificial feet. In amputations below the knee it may be difficult to prevent the end of the stump from rubbing on the limb casing, or socket, and becoming chafed. A satisfactory method of doing this is to use what is called a slip-socket. This is applied over the end of the stump and firmly attached by strapping; any friction then taking place will only affect the slip-socket. Increased lightness in limbs is secured by the use of composition materials.

Care should be taken to keep joints oiled with a light machine oil, and to keep other parts of the limb as clean as possible. The inside of a bucket, the part which takes the stump, should be washed periodically with warm water to which lysol or sanitas has been added, and dried quickly and thoroughly with a soft rag, and the outer surfaces of leather or metal fittings should be rubbed over with an appropriate polishing material.

ARTIFICIAL RESPIRATION. In cases of gas poisoning, apparent drowning, etc., when breathing has stopped, it is often possible to resuscitate the patient by performing movements which alternately expand and contract the chest, so that air is drawn into and expelled from the lungs. This imitation of natural breathing is known as artificial respiration, and may be done in several ways; Professor Schäfer's is the method now usually adopted. Before commencing this or any other method, a rapid examination should be made to ensure that the chest and neck are in no way constricted, and that the mouth and throat are clear. The reader is referred to Plate 3.

The patient is then placed face downward on the ground, his head being turned to one side to free his mouth and nose, and his arms stretched out in front. The operator kneels astride him, facing forward, his knees being about the level of the patient's hips. He places his hands over the lower ribs on either side, the thumbs being parallel and nearly touching and the fingers spread out. A common mistake of the inexperienced is to place the hands too low; they should be on the ribs, not on the loins. Keeping his arms straight, the operator now leans forward, and his weight presses the ribs forwards and inwards. The result is that air is expelled from the lungs and perhaps water, if any has been swallowed. Still keeping his hands on the chest, the operator then springs back, releasing the pressure on the chest, and this is accompanied by an inrush of air to the lungs.

The first movement should occupy the time necessary to count slowly one, two, three, and the second to count one, two. The combined movements take about five seconds to accomplish, and should be continued rhythmically until there are signs of recovery. This will be marked by gasping inspirations taking place at short intervals, followed by a resumption of breathing. In any event efforts should be persisted with till a doctor arrives, and for at least an hour. Resuscitation has been successful when artificial respiration had to go on considerably longer than this.

Once breathing has started, an energetic attempt is to be made to help the circulation. The patient should be covered with coats and warmth fostered by rubbing or chafing the limbs, the movements being made towards the heart. As soon as possible wet clothes must be removed and the patient covered with a sufficiency of warm blankets, properly protected hot-water bottles being placed at his feet and by his sides. When he can swallow he should be given sips of hot water, hot tea or coffee, or a teaspoonful of spirits of sal volatile in a small wineglassful of water. He should be closely observed for some time as he may again cease breathing, when artificial respiration must be at once resumed.

When childbirth occurs in the absence of a doctor it may be necessary for some one present to carry out artificial respiration should the child show no signs of beginning to breathe. Usually breathing begins after a few gasps, and oftener than not the baby announces its arrival by yelling lustily. Should it be quite still, the nurse must put her finger into its mouth as far as the back of the throat and hook forward so as to bring away any mucus that may be there. She should then slap the child smartly two or three times on the back with the flat of the hand, or sprinkle some cold water on the chest. This usually suffices, but if not the child may be dipped several times alternately into basins of cold and hot water. Care should be taken that the latter is not made over-hot.

Should this also fail, the lungs may be inflated by blowing into its mouth through a thin handkerchief, as in exhaling cigarette smoke, and the air is then expelled by compressing the chest, these manoeuvres being repeated in about the same times as recommended in Schäfer's method, or rather faster, and continued for a few minutes. Another method is to grasp the tip of the baby's tongue with the fingers and thumb through a handkerchief and pull the tongue forward. Still holding on, allow it to slip back, and again draw forward, repeating this about fifteen times a minute. This is widely known as Laborde's method. *See* Asphyxia.

ASAFOETIDA. The gum resin known as asafoetida owes its name to its intensely disagreeable odour. It is sometimes of use in hysteria and is a remedy for flatulence, especially for flatulent colic. For the latter purpose it may be given in an enema, one or two teaspoonsful of tincture of asafoetida in about a teacupful of soapy water. It is contained in the pill of aloes and asafoetida, of which a 5-grain pill may be taken in the evening. Another preparation is the spiritus ammoniae foetidus, of which the dose is 60 to 90 minims, or, if several doses are to be given, 20 to 40 minims.

ASCARIS. A worm which very often takes up its abode in the alimentary canal, of children chiefly, is known as the ascaris lumbricoides or the roundworm. *See* Worms.

ASCITES. The accumulation of dropsical fluid in the abdomen is known as ascites. This may occur in common with dropsy in other parts of the body, but the most marked cases of ascites are a consequence of cirrhosis of the liver, generally the result of chronic alcoholic excess. Treatment is directed to the cause, and diuretics (q.v.) are given to drain off the fluid by the kidneys. Frequently tapping is required. *See* Aspiration; Dropsy.

ASPHYXIA. The literal meaning of asphyxia is absence of the pulse, but the term is usually applied to the effects produced on the body by interference with the aeration of the blood in the lungs. The blood becomes charged with carbonic acid gas, evidenced by the lips and face becoming livid; the person breathes hurriedly and forcibly and then becomes convulsed.

Finally the breathing centre in the brain is paralysed and breathing movements stop, though the heart beats on for a few seconds longer.

Asphyxia may be brought about by disease, for example, by broncho-pneumonia, through diminution of the lung tissue available for the necessary interchange of gases, or by diphtheria, through closure of the air passages by the diphtheritic membrane ; but it may also be brought about accidentally. Thus it occurs (1) in drowning, when water or some other fluid takes the place of air in the lungs ; (2) from closure of the air passages by closing the mouth and nose, strangling, hanging, or choking ; (3) from compression of the chest, as when a person is buried in a fall of earth or is jammed tightly in a crowd ; (4) from inhalation of coal gas, chlorine, sulphurous acid and other poisonous gases ; and (5) from the action of poisons, for example, strychnine or curare.

Choking may be due to a piece of meat or some other mass becoming fixed in the air passages, or to compression of the latter by a mass which has stuck in the gullet. It may be due also to swelling of the back of the throat or of the lining of the larynx, produced by stings or by swallowing boiling water or corrosive poisons. Treatment must first be directed to the cause, which should be dealt with as follows :

Strangling : loosen, or if necessary cut, whatever is constricting the neck ; hanging : cut down ; choking : prise open the jaws, if necessary, with the handle of a spoon, which is then thrust between the back teeth as a gag (Plate 20) ; pass a finger to the back of the throat and try to hook forward the obstruction ; or, especially in children, hang the person head downward and slap the back ; compression of the chest : uncover properly if buried with earth, or, in pressure from a crowd, try to secure space by letting the person down ; poisonous gases : get the person into the open air ; if a gas mask is not available, the rescuer should cover his mouth and nose with a damp cloth. In the case of a gas-filled room it may make the removal of the patient easier if the gas is turned off and the window thrown open or a pane knocked out.

When the cause has been dealt with, if the mouth and throat have not been examined, this should always be done to ensure that they are clear ; tight clothing should be loosened ; and, if breathing has stopped, artificial respiration should be started at once. In cases of choking from stings, boiling water or corrosive poisons, some relief may be given by putting hot cloths to the throat and saturating the air with steam from a bronchitis kettle (q.v.).

When a child suffering from broncho-pneumonia becomes suddenly blue and breathless, it may help, while awaiting the doctor, to put the child in a warm bath and douche the chest with cold water so as to produce long breaths. If choking appears to be threatening in diphtheria or croup, relief may be got if the child can be induced to vomit. For this purpose a teaspoonful of ipecacuanha wine may be given. Also, the air about the child should be saturated with steam. *See* Artificial Respiration; Carbon Monoxide.

ASPIRATION. This is the name of a simple surgical operation which consists in removing fluid from the chest, the abdomen or elsewhere by suction. An aspirator is a large bottle from which the air can be pumped out and from which there passes a tube ending in a hollow needle. This can be plunged, say, between the ribs, and when the stop-cock is turned the fluid in the chest, due perhaps to pleurisy, rushes into the bottle, and the breathing of the patient is relieved.

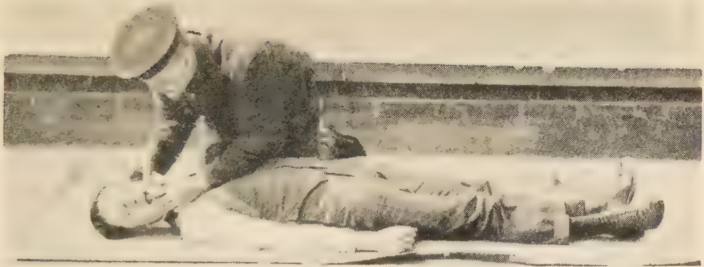
ASPIRIN. Acetyl-salicylic acid is known more commonly as aspirin. It is a useful remedy in rheumatism and relieves pain in many other conditions. In feverish colds and at the onset of influenza a good combination is a 5-grain tablet each of aspirin and quinine sulphate. This should be taken at bedtime; if taken at any other time, exposure must be guarded against, as perspiration may be free. Aspirin often quickly relieves headache. After-effects are rare, but some people find that it upsets the digestion. The dose is 5 to 15 grains. As a powder it is best taken in water. *See* Salicylic Acid.

ASSES' MILK. This is not infrequently employed as a substitute for human milk. It more closely resembles human milk than does the milk of the cow, and has proved very successful in rearing premature and feeble infants. But it is deficient in fat, and this should be supplemented by adding a teaspoonful of cream to each feeding bottle.

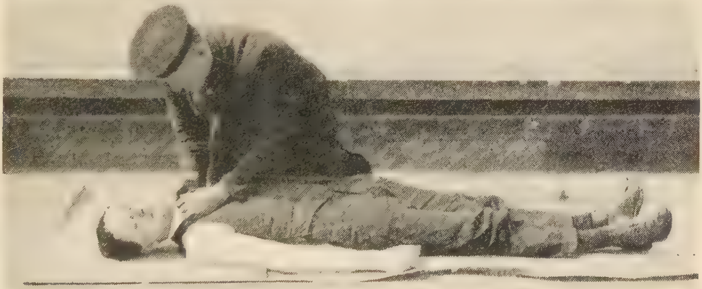
ASTHENOPIA. Asthenopia is the technical name for the particular weakness of vision in which the patient is not able to sustain the act of vision. It is thus quite different from defective vision, or amblyopia. This is a very important condition, and may be due to several different causes. It almost invariably applies only to vision of near objects. Very soon after the patient attempts to read or write or sew, there is an intolerable feeling of tiredness or actual pain in the eyes, or headache, or sometimes an appearance as if everything was turning black, or as if the letters that are being read were running into one another.

Asthenopia is most commonly due to the effort involved in accommodating the eye for near vision, when the shape of the eye is not well adapted for this purpose. Hence it is an almost constant symptom of long-sightedness. In these cases it may be immediately relieved by the use of proper spectacles. Anaemia may cause it, and the administration of iron will prove very beneficial.

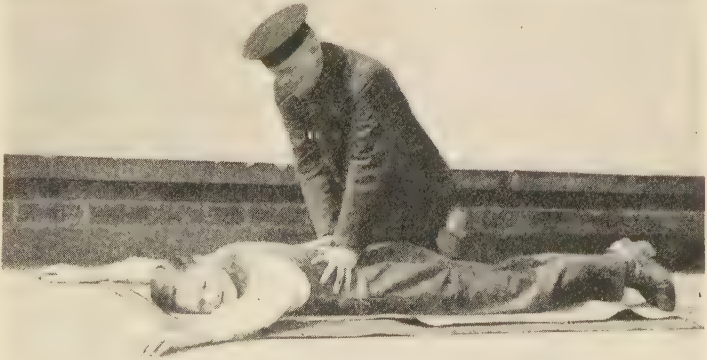
A great many cases of asthenopia are less easily curable. They are due to more general and constitutional conditions of the body.



Artificial Respiration. Schafer's. Method. Before starting the manipulations the mouth and throat are examined to ensure that they are clear.

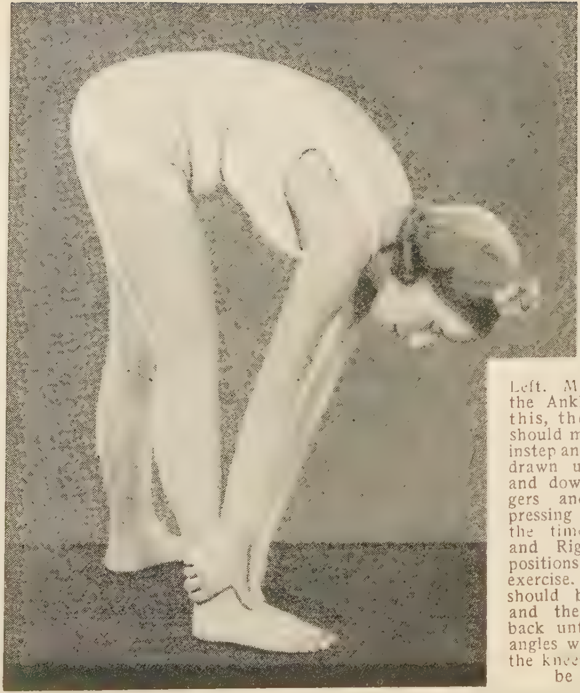


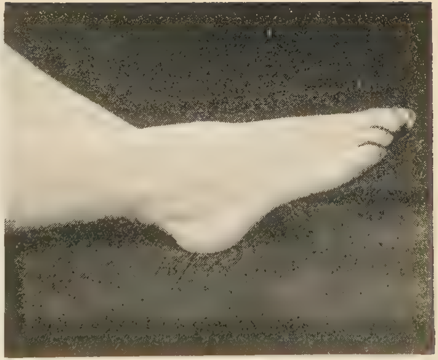
Clothing about the neck and chest is loosened and the patient then placed in a prone position, arms extended and face turned sideways.

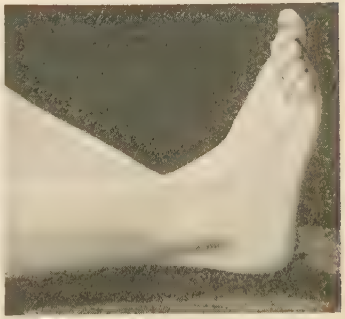


Placing his hands on the lower part of the patient's chest, he compresses it by throwing his weight forward. He then springs back, arms still rigid, releasing pressure and so letting the chest expand

ARTIFICIAL RESPIRATION : HOW IT IS ACCOMPLISHED







Left. Massaging the Ankles: to do this, the thumbs should meet on the instep and the hands drawn up the leg and down, the fingers and thumbs pressing firmly all the time. Above and Right. Two positions of an ankle exercise. The toes should be pointed and then brought back until at right angles with the leg; the knees must not be bent

MASSAGE AND MOVEMENTS FOR IMPROVING THE APPEARANCE OF THE ANKLES

They are nervous in their origin and are really a form of neurasthenia (q.v.) or nerve weakness. This kind of asthenopia often occurs in convalescence after a serious illness, and also in hysteria.

The treatment of asthenopia is the treatment of the underlying cause to which it is due. *See* Accommodation; Eye; Vision.

ASTHMA: ITS CAUSES AND TREATMENT

The Elusive Nature of a Distressing Complaint

Investigation into the causes of asthma has opened up an unexpectedly interesting line of inquiry. Its possible sources of origin are here explained, as are the methods of their detection and treatment. See Bronchitis; Emphysema; Hay Fever; Pneumonia

Sudden attacks of shortness of breath occur from a variety of causes, and to many of these the name asthma, literally panting, is applied. Thus, there are cardiac asthma from heart disease, renal asthma from kidney disease, and so on. When, however, one uses the name asthma without qualification, what is meant is bronchial asthma, in which the difficulty in breathing is due to a spasm of the muscle fibres in the walls of the smaller bronchial tubes.

The disease occurs most frequently in males and not uncommonly begins in childhood. Children of parents who have suffered from asthma are apt to inherit a susceptibility to it. In very many cases there is evidence of what is known as protein sensitisation, and the symptoms of asthma represent a reaction to foreign proteins which have entered the body. This may occur by the inhalation of pollens, of horse dandruff, or of emanations from the fur of cats or dogs, or by the ingestion of white of egg or some other food. In other cases infection by pus-producing microbes appears to be responsible. Irritation by disease within the nose is capable of precipitating attacks in some people.

A neurotic disposition is a factor which has to be taken into account in many cases, and is seen clearly in people in whom the mere suggestion that they are exposed to their provocative cause is sufficient to bring on an attack.

An attack may come on during the day, though it is much more frequent at night and after a few hours' sleep. It may do so without warning, or the patient may have been led to expect it from previous depression, indigestion, wheeziness, or some other indication. He wakes up with some difficulty in breathing which increases so that he has to sit up, and throughout his attack he is very anxiously preoccupied with the effort to breathe. To help himself he grasps or rests his hands on the bed, a chair or any other fixed support, and keeps his arms rigid, while his head is thrown back. His inspirations are short and seem hardly to expand the chest, while the expirations are prolonged and wheezing. The face is covered with sweat, and may be pale, flushed or livid. This may go on for a few hours, and then the breathing becomes easier and the patient begins to cough, bringing up first little pellets like sago grains, and later a thin frothy expectoration.

The attack may clear up completely, or some wheeziness may persist for a few days. As time goes on and attacks follow one another frequently, emphysema of the lungs appears, and tends to produce a barrel chest, that is, one in which the ribs are always more or less raised up as they are in normal inspiration.

The treatment during an attack is to provide the patient with as much fresh air as possible and to let him choose the position in which he feels easiest. If the attack follows a heavy meal, his sufferings may be shortened if vomiting can be induced by an emetic composed of a tablespoonful of mustard in half a glass of water. A cup of strong coffee is often found beneficial during attacks ; or a capsule of amyl nitrite may be broken and inhaled. The inhalation of the fumes of burning nitre or drugs like stramonium are usually resorted to sooner or later by asthmatics, sometimes as a burning powder, at other times as cigarettes. Nitre paper can be easily made by soaking pieces of thick blotting-paper in a strong solution of nitre and drying. For burning they are folded into a cone and placed on a saucer. Windows should be closed during inhalation of the fumes.

Of powders for fumigation there exist a large number, the ingredients of which, however, are selected from a few drugs, and an asthmatic pins his faith to one or the other. It may be useful to mention a few of them here :

Lobelia, powdered	1 ounce
Black tea, powdered	1 ounce
Stramonium leaves, powdered	1 ounce

Make two ounces of a saturated solution of potassium nitrate, pour on the powders, mix thoroughly and dry.

Lobelia, powdered	1 ounce
Potassium chlorate, powdered	2 drachms
Potassium nitrate, powdered	3 drachms
White sugar, powdered	3 drachms
Stramonium leaves, powdered	1 ounce

Mix thoroughly.

These powders are used by putting a little on a plate, pinching it up into a cone and igniting ; the patient holds his head over the fumes and inhales deeply. Sprays are sometimes used in preference to fumigations. Injections of adrenalin, and of preparations containing this drug, are often very useful.

While a resort to fumigations or sprays may appear to be necessary, it will be unfortunate if asthmatics rest content with the relief which they derive from them and make no effort to discover and remedy the underlying cause of their miseries. By carefully observing and making notes of the circumstances which precede the attacks, for example, the nature of the food eaten, the animals, plants, clothing or furniture of animal origin with which he has been in contact, the patient may be able to throw light on the probable cause of his disorder. His doctor may be able to give him further help by means of experimental inoculations with a variety of protein substances. In some cases good results follow the administration of vaccines.

The drugs which stand out as remedies for the conditions underlying asthmatic attacks are iodides and arsenic. Five to ten grains of potassium iodide dissolved in a third of a glass of water may be taken thrice daily after meals. The patient should order his life carefully, taking sufficient exercise, being much in the open air, and sleeping in a well-aired bed-room. His meals, of moderate size, should include only good plain food, and the evening meal should be small. Strict attention should be given to maintaining regularity of the bowels. He should seek to harden himself by baths as cold as he can bear them, followed by a good rub down, or at least he should douche his neck and shoulders with cold water in the mornings.

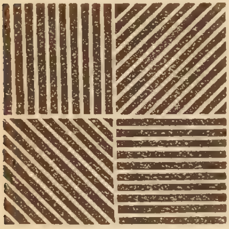
To sum up, he must leave no stone unturned in searching out and correcting the cause of his trouble, and he must keep himself as fit as he can. If he does these things early in the disease there is hope for him, but there is little if he accepts a destiny of invalidism in the drug-impregnated atmosphere of a room.

ASTHMA IN CHILDREN. The disease is not uncommon in children, and at the outset the real nature of the complaint is not always suspected. A child suffering apparently from a cold in the chest is suddenly seized with breathlessness, and may now be considered to have developed broncho-pneumonia. After a variable time the distressed breathing clears up, and simple bronchitis may persist for a week or two. Such attacks may be repeated, and it has been pointed out that a history of several attacks of pneumonia in childhood should make us think of the possibility of asthma. On the other hand, asthmatic attacks in children may resemble what has been described as occurring in older people. These may cease as the child grows older, but more frequently they persist into adult life.

The treatment is on the lines already described. In looking for a cause the possibility of rickets or adenoids should not be overlooked. During an attack the sudden plunging of the child into a warm bath may do much to relieve the breathlessness. It may help if the stomach is emptied by giving a teaspoonful of ipecacuanha wine, or the bowels cleared by a dose of castor oil. The doctor should be consulted at every turn, and medicinal treatment should be under his supervision. A resort to the use of fumigating powders should be postponed as long as possible.

Asthma is one of those diseases in which the effect of habit is important; one attack makes the patient more liable to another, so every effort should be made to prevent future attacks or at least to keep them off as long as one can. The child should live a free, active life and be much in the open air, care being taken, however, that his physical and mental capacities are not overtaxed.

ASTIGMATISM. A particular defect of the eye, resulting in defective sight, is known as astigmatism. The front part of the ball of the eye, immediately in front of the pupil, is curved forwards. For perfect vision its curvature should be the same in all directions, that is to say, the same from above downwards as from side to side; but very frequently the curvature is not the same in all directions. The necessary consequences of this will be that external objects cannot be clearly defined on the retina or "photographic plate" at the back of the eye. Astigmatism may often give rise to what is called eye-strain and cause frequent and severe headaches. Quite small degrees of astigmatism may cause trouble. Glasses are required for its correction. *See* Eye; Vision.



ASTIGMATISM. Simple test for normal vision. If the sight is correct all the lines in the diagram should appear equally distinct

ASTRINGENT. Drugs that draw the tissues together are called astringents. They act in two ways; either they actually reduce the size of the blood vessels to which they are applied, and so diminish the swelling by reducing the amount of blood which goes to the part, or else they act by solidifying some of the fluids in the part to which they are applied.

The number of astringent substances is large. Perhaps amongst the most familiar are dilute mineral acids, vinegar or acetic acid, alum, tannic acid, nitrate of silver, sulphate of zinc, copper sulphate, perchloride of iron, acetate of lead, and adrenalin. When an astringent substance is swallowed and exercises its action upon the wall of the stomach it hinders digestion, and if it passes on into the bowel and interferes with its movements and secretions, it causes constipation. The astringent substance most constantly abused in this respect is strong tea, which contains tannic acid.

On the other hand, astringent substances are often of great use in medicine. Thus alum, tannic acid, or perchloride of iron will relieve congestion or inflammation of the throat; strong cold tea is a useful eye wash, relieving congestion of the lining membrane of the eye; and many other astringent substances, most of them containing tannic acid or some modifications of it, such as catechu (q.v.) or kino, are very useful in relieving congestion of the bowel and that over-secretion by the wall of the bowel which results in diarrhoea. *See* Krameria; Tannic Acid.

ATAXIA or ATAXY. The nervous defect which results in an inability to control accurately the movements of the body is known as ataxia. Thus the inability to thread a needle or to stand upright with the eyes closed, or to walk without swaying or staggering are examples of ataxia, and are dependent upon the ability of the nervous system to co-ordinate the action of the various muscles. It is quite different from paralysis. Each separate muscle may be quite efficient, but the patient has lost the power of controlling a number of muscles simultaneously so as to produce the action that he wants.

The ataxic gait is very characteristic. The patient walks with the legs rather wide apart and throws the feet out rather aimlessly, as if he was not sure where they were going to land. When he comes to a standstill he takes care to use a broad base, so as to make the act of balancing easier, and he often remarks that a firm, hard floor feels like thick carpet or velvet to his feet.

Ataxia is a common symptom of many nervous diseases. It may be quite temporary and unimportant, as in hysteria and in various kinds of poisoning, but on the other hand, it may be permanent. It is, perhaps, the most characteristic symptom, especially in relation to the lower limbs, of tabes dorsalis or locomotor ataxia. A great deal can be done for the relief of ataxic patients by systematic training. *See* Equilibrium ; Friedreich's Ataxia ; Locomotor Ataxia.

ATHLETICS. *See* Exercise.

ATOMISER. An atomiser is a spray apparatus which projects liquids in a fine spray or cloud. It is usually worked by a rubber bulb, but may be obtained with a small metal pump. It should be used for liquids only. The instrument, as usually supplied, has two nozzles, one for the nose and another for the throat. By taking deep inspirations and compressing the bulb to time with these, the fluid may reach the back of the nose and the larynx. When the nose or throat are dry and irritated much relief may be got from spraying simply with liquid paraffin, or one may use liquid paraffin with menthol, 10 grains to the ounce. Another formula is :

Menthol	6 grains
Camphor	8 grains
Thymol	½ grain
Eucalyptol	½ drachm
Liquid paraffin B.P.	to make 1 ounce

This will be found useful in sore throat and at the beginning of a cold in the head. *See* Eucalyptus ; Inhalation ; Spray.

ATROPHY. When the tissues of the body waste or diminish in bulk either from age, disease, injury, lack of nutrition or disuse, they are said to undergo atrophy. In old age all the tissues of the body show this change ; for instance, the skin becomes thin and semi-transparent, and baldness results from atrophy of the hair bulbs. Atrophy may affect muscles in consequence of nerve disease or injury, and is accounted for partly by disuse and partly by the loss of nutritional stimulus. The wasting may be lessened in some cases by moving the patient's muscles for him, when he cannot do this for himself, by stimulating them by electricity, with which is combined massage. At other times muscular atrophy seems to depend on degenerative changes in the muscles themselves, the reasons being obscure.

General wasting in infants and young children may be due to starvation, from insufficient but more often from improper food. In what is known as infantile atrophy no cause may be obvious to account for the wasting, and it may be extremely difficult to improve nutrition. Rickets, congenital syphilis and tuberculosis may give rise to serious wasting in young children, as, indeed, may any serious illness. The opposite condition to atrophy is hypertrophy (q.v.). *See* Emaciation; Muscle; Myopathy; Progressive Muscular Atrophy.

ATROPINE. The active principle of the plant atropa belladonna, the deadly nightshade, is the important alkaloid called atropine. The virtues of belladonna, so familiar as tinctures and liniment, are due to the atropine which it contains. The chief actions of atropine are upon the skin, the heart and the eye. It arrests perspiration, and, indeed, practically all the secretions of the body; thus it makes the mouth and throat very dry. It may bring out a profuse red rash over the body. The characteristic action of atropine upon the heart is greatly to increase the rapidity of its beating. It also widens all the blood vessels of the body. It has a very striking action upon the eye, causing marked dilation of the pupils, and for this reason is frequently used by oculists.

When applied to the skin, atropine and belladonna tend to relieve pain, if it is superficial. The drug has a large number of other actions upon the body, which are of great importance, and it may be noted that in general children are particularly free from dangerous effects of atropine and are particularly likely to benefit by its medicinal use. The doses in which atropine is usually administered vary from $\frac{1}{100}$ to $\frac{1}{200}$ of a grain; it is usually used as atropine sulphate, which has the same dose. The dose usually applied to the eye is $\frac{1}{200}$ grain or less, and it may be prescribed in drops, in an ointment, or in tiny disks. There is one not uncommon condition of the interior of the eye, however, in which if atropine is employed the results are disastrous. This is the disease called glaucoma. In this and in all other cases where the pressure inside the eye is increased, giving rise to undue hardness of the eyeball on pressure and to great pain, atropine must never be employed, since one of its characteristic actions is to raise the pressure inside the eye.

Atropine may be administered at night in order to check the excessive perspiration which often occurs in consumption and other diseases. It relieves muscular spasm and thus is useful in asthma, and in renal and biliary colic. It is recommended that when the heart stops during the administration of chloroform, atropine should be injected straight into the heart muscle. Up to a certain point atropine is an invaluable antidote for poisoning by opium or morphia, by supposed mushrooms, by aconite, and by prussic acid.

Poisoning by atropine most commonly occurs as the result of swallowing the leaves of the deadly nightshade. Its symptoms and treatment are identical with those of poisoning by belladonna (q.v.).

AUDITORY NERVE. The adjective auditory is applied to the sense of hearing, to the nerve of hearing and to the centre in the brain which is connected with the function of hearing. The eighth pair of nerves that emerge from the brain itself, that is to say, the eighth cranial nerves, are the auditory nerves. Each of these nerves consists of two distinct parts, one of which is connected with the organ and the sense of hearing, and the other with the sense of equilibrium, which enables us to balance our bodies. *See* Ear; Equilibrium; Hearing.

AUSCULTATION. The art of listening to various sounds produced by the healthy or the diseased body is known as auscultation. There are two organs the auscultation of which is very important, namely, the heart and the lungs. Formerly, auscultation used to be practised by the direct application of the ear to the patient's chest. The stethoscope furnishes the medium of the newer kind of auscultation. Its advantages are, first of all, the obvious convenience to the doctor and the patient, and, secondly, the fact that it enables one to study the sounds proceeding from very small areas, instead of the confused combination of sounds that are heard when the ear is directly applied to the chest. When by long practice the doctor's ear has become accustomed to normal sounds, he is able to distinguish certain accompaniments of them or changes in their character which may indicate disease. *See* Heart; Murmur.

AUTO-INTOXICATION. The effects on the body of toxins or poisons formed within the body itself, and due to faulty metabolism, constitute auto-intoxication. The tissue changes and symptoms produced by constipation provide a good example. These are extraordinarily varied and may be of great consequence. They include headache, giddiness, dyspepsia, anaemia, physical and mental debility, muscular pain, nervousness and mental depression. The toxins proceeding from faulty intestinal digestion may contribute largely to the age changes in arteries known as arterio-sclerosis. *See* Constipation; Diet; Pyorrhoea.

AUTOPSY. *See* Post-mortem.

AUTO-SUGGESTION. Every one of us is influenced at some time or another by ideas which obtain a firm hold upon us but for which we see no logical basis. Ideas of this kind may be proposed to us by others or may arise from other external circumstances; for example, if some food substance disagrees with us once, we may conceive that it always will. This may usually happen and seem to justify the notion; but there may be exceptional occasions when the same food with immaterial differences may be taken with no untoward effect. We may become aware of this, but even then our fixed notion may be proof against a logical demonstration of its baselessness. This is an instance of auto-suggestion, a process utilised in treatment.

The method used by the Nancy school, and associated in the minds of most people with M. Coué, is for the patient to take stock of his infirmities and to repeat some such words as "In every respect, and every day, I grow better and better," about twenty times. Later, consideration of the details of the malady becomes unnecessary and it suffices to repeat the formula. The advocates of auto-suggestion lay stress upon the wording used. They say that only the positive formula should be used.

The exercise is much more effectual if it is performed just before going to sleep. There should be no effort to convince oneself of the truth of the proposition. It is not a case of forcing betterment by a sheer effort of will. Such hinders rather than helps. It is rather that the ideas enunciated sink into and become part of our sub-conscious mentality, through which they influence our bodily processes and our consciousness. *See* Hypnotism; Mind; Psycho-therapy.

BABY: THE FIRST YEAR OF LIFE

Rules for the Modern Management of Infants

This account of the baby is intended as a guide for mothers and nurses, and for all those concerned in the care of a healthy baby. See Breast Feeding; Child; Childbirth; Condensed Milk; Growth; Milk; Teeth; Vaccination; etc.

At birth a baby is about 20 inches long, and weighs about 7 lb., girls being as a rule smaller than boys. The skin is pink in colour, and the head and body may be covered with a greasy material known as the vernix caseosa. This may be somewhat difficult to remove when the baby is having its first bath, and if ordinary soap does not appear to be successful, olive oil or butter may be rubbed on and washed off with soap. The head may be covered with thick, dark hair, but this comes away sooner or later. The eyes are expressionless and of a dark blue colour, but as time goes on they assume another tint—brown, blue or grey, as the case may be.

The cranium or brain pan is large as compared with the face, the proportions being 8 to 1 in the infant, as compared with 2 to 1 in the adult. The circumference of the head is about 13 inches; at six months it is 16 inches, and at one year 18 inches. At two places on the top of the head the skull is open or unprotected by bone. These are known as the anterior fontanelle in front, and the posterior fontanelle behind. The latter closes in about two months, but the former not till about the eighteenth month. During this time it will be seen to pulsate with the heart beats and to become full and tense when the child cries.

At birth a baby should be able to grasp firmly with the hand. Hearing is developed early, but objects are not usually recognized much before six or eight weeks. Babies may contort their mouths in their first weeks of life and mothers may interpret some of their expressions as a smile, but a real smile is not common before the fifth or sixth week. Tears do not appear in the eye till about the third or fourth month, and the fact that an infant's weeping before this time is dry-eyed must not be allowed to throw doubt on the genuineness of the distress.

The motions of the bowels for the first few days are dark green in colour, consisting of a substance known as meconium ; later they become light brown, though this may change to light green, owing to the exposure of the motion to the air. A light green stool may thus be quite normal, but this should not be confused with a stool where the colour is a mixture of yellow, light and dark green ; this should always be regarded as unhealthy. The umbilical cord shrivels up after birth and drops off from the sixth to the eighth day.

A baby's bath should be of a temperature of 90° to 95° F., though the first bath should be somewhat warmer, 95° to 100°. In its preparation the cold water should be put in first, and boiling water added to produce the correct temperature. The temperature of the water should always be tested by putting the hand right in and keeping it there for some seconds, though a thermometer is better still. A bland soap should be used such as that known as superfatted.

At the first bath the child's eyes must be washed before any other part, a soft rag being used ; this is afterwards thrown into the fire. The object of washing the eyes first is to prevent possible infection from the head or other parts of the child reaching them and giving rise to the serious eye disease known as ophthalmia neonatorum. This is a fruitful source of permanent blindness. As an additional precaution the doctor may put some antiseptic drops into the eyes. After this the head is washed and dried, then the body and limbs are soaped while the baby is on the nurse's knee and the soap is rinsed off by putting the baby into the bath.

Before being put into the bath and afterwards during drying, the body should be covered with a towel. Unnecessary exposure is undoubtedly responsible for some of the indigestion and colic from which babies suffer.

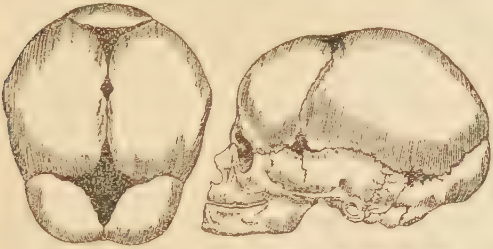
When the baby has been thoroughly but gently dried with a soft towel, the cord is dressed. The old-fashioned dressing was a piece of scorched linen, the scorching being for the purpose of destroying germs ; but a better method is to dust the cord and surrounding skin with powdered boracic acid and wrap up the cord with soft boracic lint or absorbent cotton wool. A square of either of these materials, of suitable size, is cut, a hole is made in the centre through which the cord is passed, and the fabric is then folded over. Fuller's earth should not be used as a dusting powder. The nurse should be careful that her hands are thoroughly clean before she dresses the cord, and should the skin round the cord become inflamed the attention of the doctor should be directed to it at once.

The baby should have a bath in the morning and a sponging in the evening. The clothing should be warm, with high neck and long sleeves. The binders should be soft flannel, four inches wide and long enough to go round the body and overlap about a third. They should be fastened by sewing or with tapes, not with pins. Stiff binders may press unduly on the body and may chafe the armpits and thighs. Knitted woollen socks reaching about as high as the knee should be worn, care being taken to keep the feet warm, as cold feet are a frequent cause of colic.

The baby should be put to the breast some hours after its birth, and when the mother is sufficiently rested. For about the first three days the flow from the breast is somewhat scanty, and does not consist of proper milk but of a secretion known as the colostrum. Suckling encourages the formation of milk, and the colostrum appears to assist in clearing the infant's bowels. Until the milk is flowing the baby should therefore be put to the breast at intervals of 6 hours ; if it is not content with this it may be pacified by giving it teaspoonsful of water sweetened with white or with milk sugar. Thereafter, between 6 a.m. and 10 p.m. it should be fed at 4-hour intervals, receiving, that is to say, five feeds in the 24 hours, though some babies may require to be fed at 3-hourly intervals, at any rate for a time. In the latter event the first feed might be given at 4 a.m. The feed should last as long as the baby is actually taking milk but no longer ; this will be about twenty minutes as a rule. Whichever time-table is adopted, it should be punctually adhered to. On no account should the baby be put to the breast merely to pacify it, but there is no harm in giving it a little plain warm water in a teaspoon. While feeding, and at all other times, the head of a young baby must be well supported.

It may be assumed that a baby is being properly nourished if it sleeps well and shows a progressive gain in weight. It should be weighed once or twice a week, and the gain each week should be 5 ounces or more. The baby should double its initial weight at five months and treble it at twelve to fifteen months. If it appears that the supply of milk is inadequate, the mother should supplement her diet by extra milk, eggs or meat. The practice of giving stout or other malt liquors for this purpose is not a sound one ; milk is very much better.

If the breast milk still appears to be insufficient the baby should get a bottle-feed of milk and water proportioned to its age alternately with, and in place of, a breast-feed. Artificial feeding may become necessary, though it has drawbacks. It may be difficult to get an artificial food which the baby can digest easily, as it does its mother's milk, and there is a great risk of dangerous microbes getting into the food. Only the most urgent reasons can, therefore, suffice for taking an infant off the breast. It may have to be done if the mother suffers from tuberculosis or another infectious disease, or from cancer, or if she is very debilitated, for example, from anaemia. Other reasons are abscess of the breast, insufficient development of the nipple, harelip in the child, and the fact that the child is not thriving in spite of everything having been done to improve the mother's milk.



BABY'S SKULL. The fontanelles or soft spaces

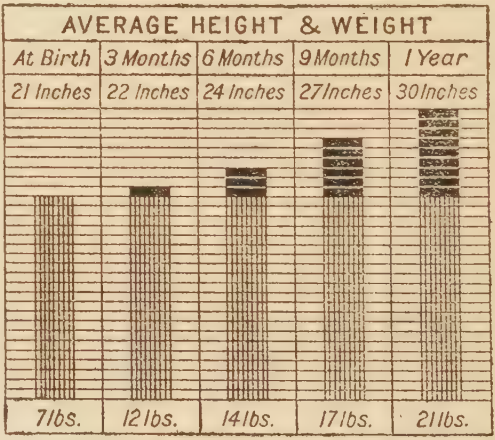
The food which should now be tried, and which is usually quite successful, is cow's milk, though this must be diluted to make it more like human milk and so within the compass of the baby's digestion. It may be diluted with ordinary water, with barley water, or with water and a tablespoonful of lime water. The mixture is sweetened with white sugar or with milk sugar, and a half to one teaspoonful of cream is added to each bottle. The total amounts of the feed for various ages are shown in the following table :—

First week	1 ounce
Second week	1–2 ounces
One month	2–3 ounces
Two months	3–4 ounces
Three months	4 ounces
Four months	4½–5 ounces
Five months	5 ounces
Six months	6 ounces
Seven months	7 ounces
Eight months	8 ounces
Nine months	8–9 ounces

For the first week or two the proportions should be one part of milk to two of the diluent, but thereafter, till six months, half and half. Barley water should be strained hot through a thin white cloth which has been boiled. Children vary, of course, in their capacities, and the above figures must be modified accordingly.

During the first six months six feeds are given in the 24 hours, beginning at 6 a.m. and finishing at 9 p.m., and, during the next three months, five feeds. The proportion of cow's milk is increased gradually after six months, and from this time onwards rusks may be allowed.

The cow's milk, which should be received in sealed bottles, is pasteurised for the baby's use. Forms of apparatus are sold for this purpose, consisting of the requisite number of bottles with rubber stoppers, and a tin receptacle in which the bottles, filled with the appropriate milk mixture, are boiled. But the process may be simply done by pouring the milk into a clean jug and placing this in a saucepan of water. In either case the water is brought to the boil and kept thus for twenty minutes. The milk is then put away in the cleanest and coolest place available. In hot weather the bottle should stand in cold water or on ice.



BABY. Table of growth in height and weight

When the feed is not sterilised in the bottles, a boat-shaped bottle with a large teat and a rubber valve stopper should be used, and the most scrupulous cleanliness must be observed in making up the mixture. The opening of the teat should be neither too small nor too large, though the mother or nurse should not test this by putting the teat in her own mouth; this information can be obtained by observing how the baby gets on with it. Provided the teat is satisfactory the baby should take as long as he wishes.

Immediately he has finished the feed, the bottle should be thoroughly washed out with clean water, and the teat and stopper should be cleaned. Preferably two such bottles should be used, so that each may have a thorough soaking in clean water before being again used; a teaspoonful of baking soda may be added to the water with advantage. Once or oftener during the day the bottles should be scalded after they have been thoroughly washed with cold water.

Artificial foods, such as Allenbury's and Mellin's, can be used advantageously for the night feed and perhaps during the day in place of a milk feed. When on artificial feeding, babies should get a teaspoonful of orange or grape juice once or twice a day between feeds, to ensure the requisite vitamin supply.

When the baby is nine months old it should be gradually weaned, though this should be delayed if the weather is hot or if the baby is indisposed from teething or otherwise. To begin with, he gets a meal of arrowroot, ground rice or barley jelly with milk; then oat-flour rusks, breadcrumb and gravy, bread and milk, veal, chicken or mutton broth from which the fat has been strained, egg custard; and later he may be given eggs, lightly cooked, pounded chicken, mutton or white fish, a mealy potato, cauliflower, milk puddings and bread-and-butter.

A baby generally cuts its first tooth at six months, though this may be considerably delayed without there being anything wrong. The first teeth to appear are the lower central incisors, then from the eighth to the tenth month the four upper incisors appear, and from the twelfth to the fourteenth month the lower lateral incisors and all the front molars.

The practice of giving a baby a dummy teat or comforter in an attempt to mitigate its teething troubles is very unwise. The teat affords an easy means of conveying dirt and infection to the child, and its use may lead to deformity of the jaws.

A baby should always have its own bed—a crib and not a cradle—as this makes for better rest for both mother and infant and avoids the risk of overlying. The mattress of the cot should be protected by a waterproof sheet, which should be washed regularly. The baby should be taken out as much as the weather permits, and when indoors should be in a light and well-ventilated room. It should be warmly clothed, care being taken to keep the feet warm, but the opposite error of swathing it in too many clothes must also be avoided. In Plate 5 will be found illustrations of the best type of feeding bottle, and also of a few appliances for use in the nursery.

BACILLURIA. The presence of any kind of bacillus, the rod-shaped type of microbe, in the freshly voided urine may be described as bacilluria. More frequent than any others, however, is an organism which normally inhabits the bowel, the bacillus coli communis. This makes its way to the kidneys, and multiplies freely, enormous numbers being passed with the urine. Although their presence may impart a sheen to the urine or even make it turbid, often enough it is quite clear and appears normal.

Also, while there may be pain, often severe, in the loins, over the bladder or in the urethra, with frequent and painful micturition, in other cases there may be no more than a slight increase in the frequency of passing water or, perhaps in a child, bed-wetting, the true significance of which may be overlooked unless a bacteriological examination of the urine is made. The same difference is noted regarding general symptoms, which may range from high fever, with shivering or perhaps, in a child, convulsions, to merely vague sensations of indisposition and occasional slight rises of temperature. Children, especially girls, and pregnant women, are the most frequent subjects of bacilluria.

The disorder requires careful medical supervision. The patient is put to bed on a simple light diet, and the bowels are kept freely open. The urine, which is always acid in bacilluria, must be rendered alkaline, and to this end potassium citrate and sodium bicarbonate may be given in liberal doses every two hours. A child might receive 20 grains of the former and 15 grains of the latter, but it may be necessary to increase these doses largely. This treatment is kept up for several days, when it may be possible to reduce the doses. *See* Bladder ; Hexamine ; Urine.

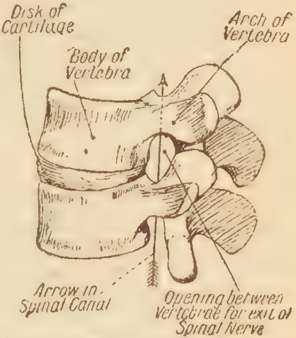
BACILLUS. Certain kinds of germs or microbes which are shaped like little rods are known as bacilli (singular bacillus ; Italian, a little rod). They include nearly all the important microbes. The diseases which are known to be due to bacilli include tuberculosis, anthrax, diphtheria, typhoid fever, many kinds of diarrhoea, leprosy, glanders, plague, lockjaw (or tetanus), and very many more. Bacilli, also, are responsible for acid fermentation or acidity (q.v.). *See* Bacteria.

BACK. The supporting structure of the back is the spinal column or backbone, to which also the back owes its curves. In the dorsal or chest region the curve is backwards and the body wall is supported by the ribs, but the curve is forward in the lumbar region or loins, and the place of the ribs is taken by sheets of muscle and of strong fibrous tissue or fascia. Fibrositis is common in this part of the back, where it is known as lumbago. The kidneys lie in the back and are partly covered by the lower ribs, but they are not so frequently a direct cause of backache as is popularly supposed. It is important to remember that in protecting the chest from exposure to draughts and cold winds it is very necessary also to safeguard the back, as the bulk of the lung tissue is towards the back. When a patient is confined to bed careful watch must be kept on the lowest part of the back, as bed sores are prone to form there. *See* Backbone ; Fibrositis ; Lumbar Region ; Spinal Curvature.

BACK-ACHE. The back is often the seat of an aching pain which may be very disabling. This may occur to some extent in any febrile disease, but is more marked in influenza and smallpox than in most. A pain between the shoulders is not uncommon in stomach disorders, and in gall-stones the pain often strikes up to the back of the right shoulder ; in piles there may be dull pain at the bottom of the spine. Pain in the back may be due to spinal disease, a fact which should always be borne in mind. A dragging pain often occurs in women from disorders of the womb. Anaemia, hysteria and neurasthenia are amongst numerous conditions in which back-ache may be a feature.

The treatment of back-ache must be directed to the cause, though the application of heat usually produces some benefit, at any rate of a temporary nature. In lumbago the pain is frequently severe, particularly when the patient attempts to move. Rest in bed with a hot-water bottle to the back, and one or two 10-grain doses of aspirin may afford relief. *See* Fibrositis; Rheumatism.

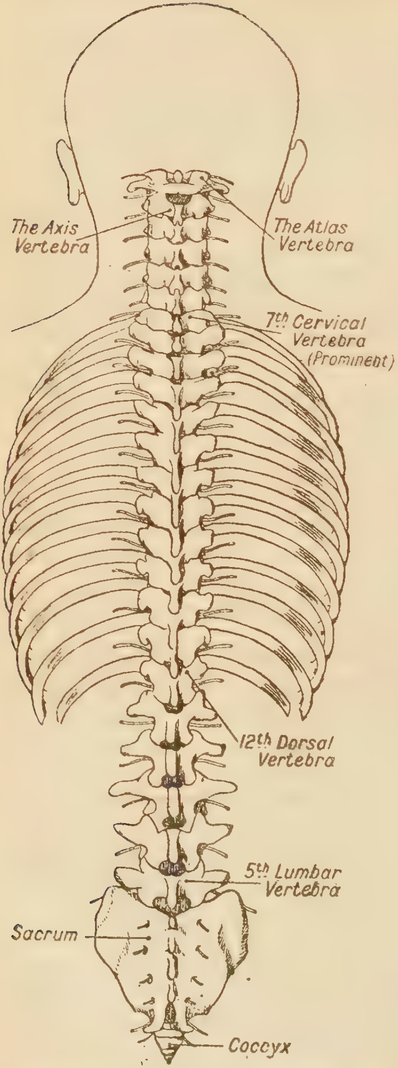
BACKBONE. The spine, or spinal column, popularly known as the backbone, really consists of a great number of small bones called vertebrae. These are named according to their position: thus the seven vertebrae in the neck are called cervical; the twelve vertebrae from which the ribs arise are called dorsal; below them are five much larger ones which carry no ribs and are known as the lumbar vertebrae. The next vertebrae have already fused, even in the new-born child, into a single bone called the sacrum. In the lower animals the backbone is continued onwards from this point as the tail, which consists of a number of vertebrae more; but in man, that is to say, in man after an early stage of development before birth, the tail is represented only by four small, useless and degenerate vertebrae which have fused together into a single bone called the coccyx. This bone is attached to the lower end of the sacrum.



BACKBONE. Parts of a vertebra

The backbone is, in the first place, the foundation of the skeleton of the body. It supports the head; it gives rise to the ribs, upon which the arms are attached; and through the sacrum it is attached to the pelvis or hip bone and thus transmits the weight of the body to the legs. The vertebrae are united to one another by very powerful attachments; and the backbone is covered behind with a very large and complicated series of powerful muscles which are grouped together under the name erector spinae. Inside the abdomen, also, there are muscles attached to the front of the spine, which bend the body forwards, or if necessary bend the thighs upon the body.

But in addition to all this the backbone has a function which exactly corresponds to the function of the skull; for whilst the



BACKBONE. Bones of the spine seen from behind

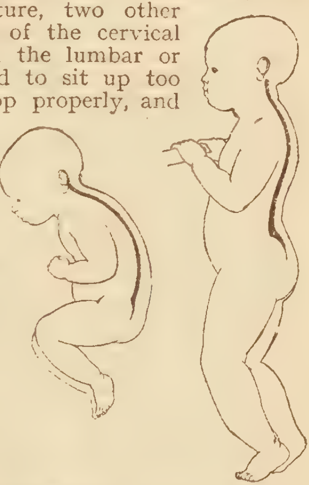
skull contains the brain, the backbone contains that continuation of the brain which is called the spinal cord. So powerful is the backbone, so thick are its bones, and so thickly are they covered by muscular tissue, that the spinal cord is far more completely protected from external injury than is the brain.

The individual vertebrae are separated from each other by elastic disks, so that the spine is not only strong, but is pliable to a considerable degree. Hence, the accidents affecting the backbone are comparatively uncommon. Accidental dislocation is very rare ; fracture occurs only as the result of the most violent injuries, such as being run over by a train or crushed in a coal mine. Fractures of the spine, however, are often complicated by dislocation. The injuries to the bone are dangerous because of the liability of the spinal cord to be compressed or injured, leading to paralysis, possibly to death, if the upper part of the spine should be implicated.

The backbone is not uncommonly affected with tuberculosis and other diseases, one effect of which is to produce some alteration in or addition to its natural curves, and this may also happen from muscular weakness and faulty postures, especially in young people.

At birth the spine viewed from the side has only two curves, a long backward curve of the whole spine down to the sacrum and the backward curve of the sacrum itself. Thereafter, from the assumption of the erect posture, two other curves develop, a forward curve of the cervical vertebrae and a forward curve in the lumbar or loin region. If a baby is allowed to sit up too early these curves may not develop properly, and the back will be round.

An increase of the backward curvature of the spine is known as kyphosis. It may arise from a faulty posture, as in stooping over one's work. Tailors are subject to it, and it is common in school children who work at desks which are not sufficiently high. Those who suffer from myopia or short-sightedness are especially prone to it. When portions of the vertebrae are destroyed, as in tuberculosis, a sharp backward projection occurs at some part of the spine, and is known as an angular curvature. An increase of the forward curve in the loins constitutes lordosis. In addition to the exaggerations of the normal curves, the spine is frequently found to curve to one or other side. This is known as lateral curvature. *See* Child ; Dislocation ; Fracture ; Jacket ; Pott's Disease ; Spinal Cord ; Spinal Curvature.



BACKBONE. Left, backbone at birth; right, development of normal curves

BACTERIA. When Pasteur discovered the existence of numerous minute, living plants which caused disease, he called them microbes, from the Greek words for little and life. The terms microbe and micro-organism, which later came into use, are now understood to include not only vegetable parasites but minute animal forms, for example, the malaria parasite. The name applied by botanists to the former is bacteria, a single one being called a bacterium, again from a Greek word meaning a little stick. In botany bacteria are placed in a group by themselves, though formerly they were considered to be forms of fungus ; hence the name schizomycetes or fission-fungi. They exist practically everywhere in Nature, and we could hardly live without them. They are the world's scavengers, destroying dead animal and vegetable matter.

Of the innumerable species of bacteria there is a small number which are able to live within the living body of man. Some of these do him no harm. They live on the skin, but cause no injury there. They live and multiply enormously in the bowel, and ordinarily do no harm. Other bacteria are pathogenic, that is to say, they can produce disease in the body.

Bacteria are very minute, from $\frac{1}{5000}$ to $\frac{1}{10000}$ of an inch in length, and various forms are recognized : a rounded form (coccus or micrococcus), such as the germs of suppuration, of pneumonia and gonorrhoea ; a rod-shaped form (bacillus), for example, the germs of tuberculosis, of typhoid fever, and of anthrax ; and a wavy thread-like form (spirillum or spirochaeta), of which the germs of relapsing fever and of syphilis are examples. Such germs are caught by the porcelain candles of a Pasteur-Chamberland filter, but there are very minute forms which pass through, and these are known as filterable viruses. Smallpox and rabies are amongst the diseases caused by such an organism.

A sufficiency of moisture is necessary for the activity of all bacteria ; consequently it is desirable, when possible, that the dressings on a wound should be kept dry. Warmth favours their activity ; they may survive freezing, and diseases such as enteric fever and cholera have been carried by ices. They are killed by a sufficient degree of heat, especially moist heat, so surgical instruments, etc., are boiled for at least 15 or 20 minutes before an operation, while dressings are disinfected by steam under pressure. Sunlight inhibits bacterial growth, and in the case of the typhoid bacillus, quickly kills it. Some bacteria require air or oxygen, or are aerobic, while others, the anaerobes, like the bacillus of tetanus, can only flourish in the absence of air.

The pathogenic bacteria are able to invade and multiply in the living tissues of the body. They do harm by producing poisonous substances, or toxins, which are of two kinds : the first, known as exotoxins, are liberated by the living bacteria, while the second, or endotoxins, are contained in the bacteria themselves, and are not liberated till the bacteria are dissolved.

The effects of bacterial invasion are well illustrated in the case of the specific fevers. After the actual entry into the body nothing takes place for a certain time, varying in different diseases. This is known as the period of incubation, when the bacteria are multiplying and establishing themselves. This is succeeded by a period of great activity when the bacterial poisons cause constitutional symptoms, such as fever, and local symptoms depending upon the tissue which bears the brunt of the disease. The patient may succumb, or his tissues may produce protective substances in sufficient amount to repel the attack. *See* Antibody ; Antiseptic ; Antitoxin ; Immunity ; Virus.

BALANCE. *See* Equilibrium.

BALANITIS. An inflammation of the glans penis constitutes balanitis. The usual cause is lack of cleanliness, and this is most likely to occur when the foreskin is long. The foreskin should be retracted and the parts washed regularly, care in this respect being often neglected in little boys. If there is any difficulty about this, circumcision should be performed. *See* Circumcision; Genital System; Phimosis.

BALDNESS. The loss of hair of the head may be due to many different causes. The true senile baldness, or the baldness of old age, is doubtless due to a simple atrophy (q.v.) or wasting of the hair bulbs, in common with the wasting of many other parts of the body as age advances. It is doubtful whether much can be done by way of arresting this kind of baldness, but anything that increases the flow of blood through the scalp helps the nutrition of the hair. Thus vigorous brushing, massage of the scalp, perhaps with some mild irritant, such as lotions containing ammonia or alcohol and cantharidin, may be of some use.

Premature baldness in some instances resembles senile baldness, but is usually totally different in causation. It occurs in young people quite often at the age of twenty, and may have given rise to very great loss of hair by the age of thirty. Premature baldness is far more common in men than women. As a rule the cause is bacterial disease of the hair roots, which is known as seborrhoea or scurf, and which may make its appearance at fourteen or fifteen years of age. Sometimes, however, there is no diseased condition of the hair to be detected, but it simply disappears. In such cases it will be found that the disease is hereditary.

Temporary loss of hair is, of course, exceedingly common, The hair of many people falls out excessively during the summer. but soon returns. The hair constantly falls out as a result of various acute diseases, such as typhoid fever or erysipelas, and it tends to become thin in consumption and in other forms of wasting disease. In practically all these cases the hair returns to its former abundance when the hair bulbs have recovered from the weakening influence of the disease. Occasionally the hair may fall out for a time owing to the influence of anxiety or shock upon the nervous system. Many skin diseases cause baldness, such as eczema, and parasitic diseases such as favus and ringworm. It is very frequent in the secondary stage of syphilis.

There is one exceedingly common form of patchy baldness which very much resembles ringworm, and is often confused with it, but is in reality quite distinct. Its technical name is alopecia areata. The patches may be an inch or even more across. The course of this disease varies in different cases. It is said that if the baldness lasts for over two years the hair is very unlikely to return. Sometimes it may only last for a few weeks. The disease may affect several members of a family, and this suggests a parasitic origin, but in many cases it would appear to be due to malnutrition of the skin of nervous origin.

Another suggestion is that it is due to the infection of the mouth, tonsils, nose or throat with a streptococcus.

Whenever baldness is due to dandruff (q.v.) the essential part of the treatment is to attack and cure that condition.

To encourage the growth of the hair when the scalp has been cleaned in alopecia areata and in baldness due to acute diseases and other debilitating causes, a stimulating lotion will be useful. The following may be used:

Strong solution of ammonia	½ ounce
Chloroform	½ ounce
Oil of sesame	½ ounce
Oil of lemon	½ ounce
Spirit of rosemary	2 ounces

The lotion should be rubbed into the roots of the hair night and morning. It should not be forgotten that the massaging of the scalp which accompanies the application of the lotion is an important part of the cure. Stimulating the scalp by the use of electricity is also beneficial. It will often be found that an iron tonic is very helpful in promoting growth of the hair, such as two Blaud's pills thrice daily or a liquid preparation of iron.

As regards alopecia areata, in view of the possibility of its being due to infection in the mouth, nose or throat, it is necessary to search for a focus of infection in these parts and clear it up. Vaccines prepared from swabbings of the nose and throat of patients suffering from this form of baldness have been successfully used. Applications of ultra-violet rays have proved to have a potent influence in promoting hair growth in alopecia areata. *See* Dandruff; Hair; Jaborandi; Light; Seborrhoea.

BALSAM. Balm or balsam is the name applied to oily, pleasant-smelling substances which flow out from certain plants, sometimes spontaneously, sometimes after cuts have been made in the stem or leaves. They are mixtures of oil, resin and, as a rule, benzoic acid (q.v.).

The most familiar kind of balsam, invented by the friars many centuries ago and popularly known as Friar's Balsam, is powerfully antiseptic in virtue of the benzoic acid which it contains. When applied to wounds, besides acting as an antiseptic, it aids in the arrest of bleeding. The technical name of Friar's Balsam is compound tincture of benzoin. It is sometimes given by the mouth, but more frequently by inhalation.

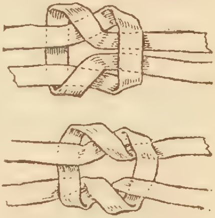
The other balsams used in medicine are copaiba, balsam of Peru, balsam of tolu, and storax or styrax, and all are of value in chronic bronchitis. The chief use of copaiba, however, is in gonorrhoea. Syrup of tolu is often included in cough mixtures for children, the dose for a child of six being 10 to 20 minims. Storax and Peruvian balsam are sometimes used in parasitic skin affections. *See* Benzoic Acid; Peruvian Balsam; Storax; Tolu.

BANDAGES AND BANDAGING

How to Apply the Triangular and Roller Forms

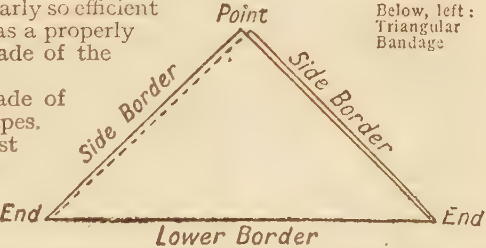
Although a fairly simple process, bandaging requires a certain amount of study and practice for its right performance. From the instructions here given it should be possible for everyone to learn how to apply a bandage properly to any part of the body. See First Aid; Fracture, Splint; Tourniquet, etc.

There are many different kinds of bandages, most of which can be successfully applied after a short training by any intelligent person. It may be said that the uses of bandages are threefold. In the first place, they may be employed to keep surgical dressings or splints in place. Secondly, they may be used for the sake of their direct pressure upon the part to which they are applied, as in the case of sprain or when they are used to arrest bleeding. Their third use is to give support to the circulation in cases of varicose veins, or to injured parts, as, for example, a broken lower jaw or broken ribs, when the bandages also restrain movements. For varicose veins various other devices are used, such as the elastic stocking, but no elastic stocking is nearly so efficient or so comfortable as a properly applied bandage made of the proper material.



BANDAGE. Above, reef knot, the best to make. Below, granny knot, which is unsafe

Bandages are made of many different shapes. Of these the simplest and the oldest is the triangular bandage, sometimes called the first aid bandage. It is of value in emergencies, but, as a rule, not so efficient as the other kind of bandage usually called the roller bandage.



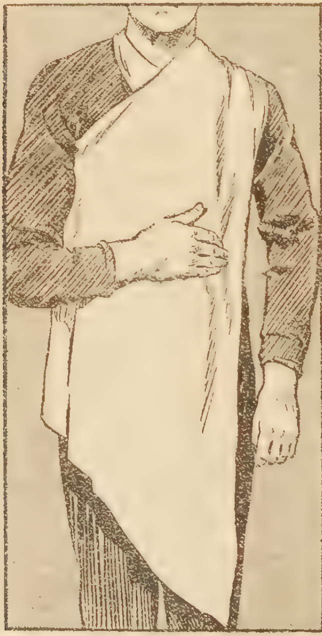
Below, left: Triangular Bandage

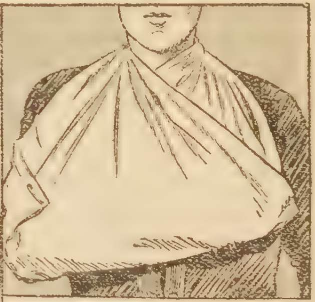
Triangular Bandage. The triangular bandage is made by taking a piece of fabric, usually calico, 38 inches square and dividing it diagonally, though for some purposes a folded handkerchief will serve. In order to follow a description of the modes of application of this bandage it is necessary to know the names which are given to its various parts. The largest side of the triangle is known as the base or lower border, the other two sides being the side borders. The angle opposite the base is the point and the others form the ends. Reference to the diagram will make these terms clear.

The bandage may be used as the whole cloth, that is, without folding it; or it may be used as the broad or the narrow fold. The former is made by bringing the point down to the base and folding again; if folded once more we get the narrow fold. In tying this or any bandage a reef knot must be made, as a granny knot is liable to slip. The methods of tying these knots will be best understood by reference to the diagram on the previous page, noting that when a reef knot is tied the ends lie parallel with the direction of the bandage, whereas in the granny they lie across it. When the knot has been tied the ends should be neatly tucked away under the bandage.

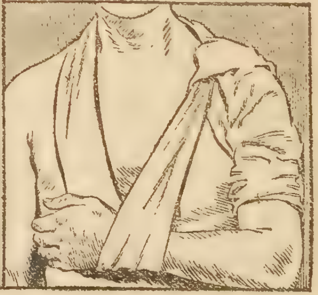
The methods of applying the bandage for various purposes are as follows:

Greater Arm Sling. This supports the whole forearm, from the elbow to the wrist. Take the whole cloth and place one end over the sound shoulder, with the point towards the injured limb. Carry the forearm across the cloth and bring up the other end over it and over the shoulder on the injured side. Knot off behind the neck. Then take the point, carry it forward in front of the elbow and fasten with a safety pin. The greater arm sling is illustrated above.





Greater arm sling completed



TRIANGULAR BANDAGE. Left, first stage of greater arm sling; right, bandages for shoulder combined with lesser arm sling

Lesser Arm Sling. This supports the forearm at the wrist only. Use a broad or a narrow fold. Place one end over the sound shoulder, bring the other over the wrist, which has been carried across the body at the desired level, over the sound shoulder, and knot off behind the neck. Should the patient complain of the pressure of the knot when using either sling, the position of the knot may be changed and a pad of cotton-wool may be placed beneath it.

The whole cloth is also used in applying to the following parts :

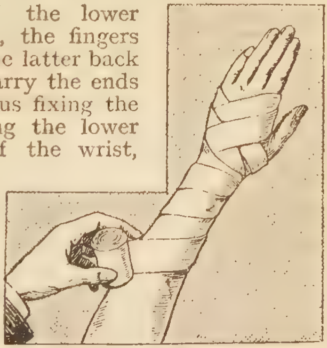
Head. For a scalp wound, fold the lower border so as to make a hem an inch wide, and place the centre of the border on the forehead above the root of the nose, the point being thrown backwards over the head. Carry the ends round and cross below the occipital protuberance, the prominence at the back of the head, fixing down the point in doing so. Bring the ends forward and knot over the forehead. Draw down the point so that the bandage is smoothly applied over the head, carry it forward and fix with a safety pin.

Shoulder. Apply the centre of the lower border to the outside of the upper arm about the middle, the point lying upon the neck. Carry the ends round, cross on the inside, bring out and tie off. Put on a lesser arm sling for the injured limb. Pull the point up beneath this so that the bandage covers the shoulder smoothly. Bring the point down over the sling and pin off.

Hand. Apply the middle of the lower border to the front of the wrist, the fingers being towards the point. Carry the latter back over the fingers to the wrist. Carry the ends to the back of wrist and cross, thus fixing the point. Then cross in front, fixing the lower border. Tie off on the back of the wrist, and pull the point up to make the bandage taut. Take the point down over knot and pin off.

Hip. This is bandaged like the shoulder, except that the point is fixed by a narrow-fold bandage carried round the body and tied off on the opposite side.

Foot. Place the sole on the bandage, the toes towards the point, and proceed as for the hand.



BANDAGE. Showing one applied to hand and arm in figure of 8 loops spirally

Chest. This is for a wound. Place the cloth over the dressing, with the point over the shoulder on the injured side. Carry the ends round the body and tie off so as to leave one end long, this being then brought up and knotted with the point.

Perineum or Fork. Carry the ends round the waist and knot off in front, leaving one end long. Bring the point forward between the thighs and knot off with the end. In some cases the bandage will be applied in front and knotted behind.

For the following parts either the broad or narrow fold is used :

Eye. Place the centre of a narrow fold bandage over the eye. Carry one end obliquely across the brow and another over the ear. Cross below the prominence at the back of the head, bring forward and tie over the dressing.

Neck, Arm and Forearm. Place the centre of a narrow fold over the dressing, carry the ends round, cross, bring back and tie over the dressing.

Thigh and Leg. Proceed as above, using a broad fold.

Elbow. This is done with the forearm bent up to a right angle. Place the centre of a broad fold over the point of the elbow. Cross in front and carry back round the forearm, overlapping the lower edge of the bandage already applied. Cross again in front, carry back round the arm, overlapping the upper edge, and knot above the elbow.

Knee. Proceed as above, except that the ends are first carried round the thigh so that the knot is made below the kneecap.

Chest. Bandage for a broken rib. Place the centre of a broad fold over the fracture, that is, the point where the pain is felt in breathing ; carry the ends round the body and tie. Apply a second broad fold bandage so as to overlap the first, above or below, according as the fractured rib is a lower or an upper one. The bandages should be just sufficiently tight to restrain the breathing movements somewhat. If the pressure appears to cause pain the bandage should be taken off.

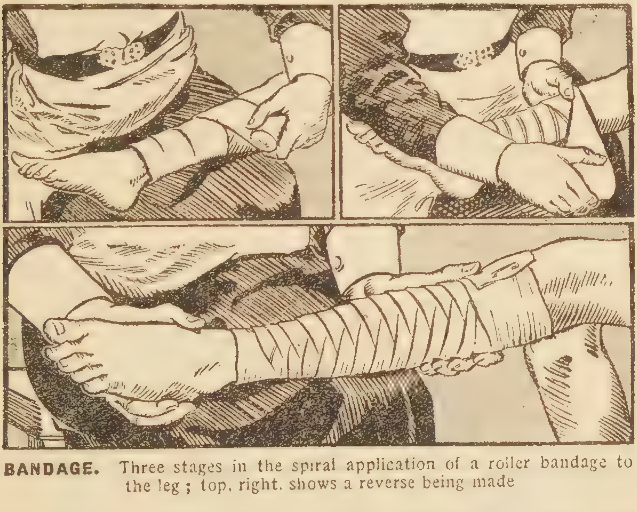
Abdomen. Apply the centre of a broad fold bandage over the dressing ; carry the ends round the body and knot off.

ROLLER BANDAGE. The roller bandage may be from one to twelve yards long and from one to six inches wide. It is generally made of cotton, bleached or unbleached, but may be of muslin, linen, flannel, crêpe, pure rubber, woven elastic, or other material. In preparing most bandages the requisite widths are torn from the piece of material. To roll up, fold up one end two or three times so as to form a tight core or " head," on which the " body " is rolled. The free end of the roll is known as the " tail."

In bandaging a limb always begin on the inside, applying the outer surface of the tail and rolling outwards across the limb. No more than three or four inches should be uncovered at a time. To fix the bandage, a few turns are taken round the limb, then succeeding turns pass obliquely upwards, each turn covering about two-thirds of the preceding one. It will be found that after a few turns, owing to the limb being more or less conical, the bandage will not lie smoothly unless what is known as a reverse is made. The thumb of the free hand is placed in front of the turn which is unrolling, the body of the bandage is twisted round towards the operator, and the turn is completed with the reverse side of the bandage in contact with the skin. Another reverse is made, parallel to the first, when the bandage again comes to the front, and this is continued till the bandage lies evenly without reversing.

The methods just described are the simple spiral and the reversed spiral. Another method is adopted in bandaging a joint. A turn is taken round the middle of the joint; the next turn overlaps the first below, and the next overlaps it above. This is continued till the joint is covered in by alternate loops above and below. This is known as a modified figure of eight.

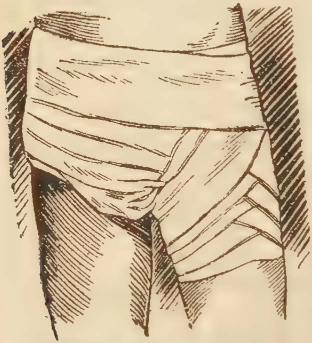
A simple figure of eight may be used at certain joints; for example, in bandaging the leg, in order to fix the bandage below, a few turns are taken round the foot. The bandage is then carried up round the ankle and again taken round the foot. After a few turns the bandage is continued up the leg as a reversed or simple spiral. The method is also useful when bandaging the forearm, the first few turns being taken round the wrist.



BANDAGE. Three stages in the spiral application of a roller bandage to the leg; top, right, shows a reverse being made

A variety of figure of eight bandage, known as a spica, is used for bandaging the shoulder, groin, thumb and great toe. As will be seen, it consists of alternate large and small loops.

Groin. In bandaging the groin, the tail of the bandage is laid along the groin, pointing inwards and downwards. The roll is then carried round the loins just below the edge of the hip bones, brought across the front of the body and thigh and round the latter, as completing the first figure of eight. The others are formed in the same manner, each layer overlapping two-thirds of the preceding one. To bandage both groins, begin as above, and for clearness let it be assumed that the tail of the bandage is laid along the right groin. After taking the roll round the loins, instead of carrying it round the right thigh it is carried back between the thighs and round the left one. It is then carried round across the front of the body and round the loins, but this time it is taken round the right thigh, and so on alternately round each thigh, when the bandage is brought forward from the loins. This is the double spica.


BANDAGE. Roller bandage for the groin

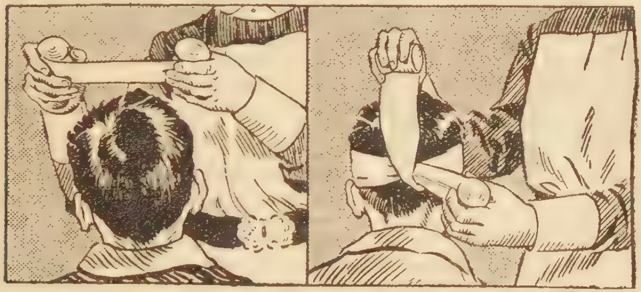
Thumb and Great Toe. In bandaging the thumb a few turns are first made round the wrist, the back of the hand being upwards, and then a turn round the thumb near its tip and back to the wrist. These alternate loops are made till the whole thumb is covered in. The great toe is bandaged similarly.

Finger. In bandaging a finger, a few turns are made round the wrist, the hand being held with the back upwards. A few inches of the tail of the bandage are left loose for the purpose of tying off. The bandage is then carried down to near the tip of the finger and continued up the finger by a series of spiral loops till the root of the finger is reached, when the bandage is again carried up to and round the wrist and tied off. If there are more fingers than one to be bandaged, instead of tying, the bandage is taken to the tip of the next finger in order and so on.

Breast. In applying a supporting bandage to the breast, the left one being taken as an example, the operator stands in front of the patient and, after taking one or two turns from left to right round the body just below the breasts, he raises the breast with one hand and brings the bandage below it from behind forward, continuing over the opposite shoulder to the left armpit and round the waist. A second turn below the breast is then made, and these alternate loops are made until the breast is covered almost to the nipple. In bandaging both breasts the process is begun as above, but instead of making the second turn below the left breast the bandage is continued on round the waist and then across the back to the left shoulder. It is now carried downwards in front beneath the right breast and round the waist, again lifting the left breast as it comes forward, and so on.

Neck. To bandage the neck the operator stands in front of the patient and lays the tail of the bandage on the front of the shoulder on the injured side, pointing upwards and inwards across the shoulder. While the tail is fixed by one hand, the roll is carried under the armpit and up behind to the root of the neck, in front of which it then passes. It is carried round the neck and again under the armpit. When a sufficient number of turns have been made to fix the bandage, it is carried by spirals up the neck. If necessary, when the neck has been covered, a turn or two may be taken round the head, running up above the ear on the sound side, across the forehead and down over the other ear, round the neck and again round the head.

Head. To cover in the scalp the double roller capelline bandage is used. This is simply a long roller bandage, the two ends of which have been rolled in opposite directions till they meet.

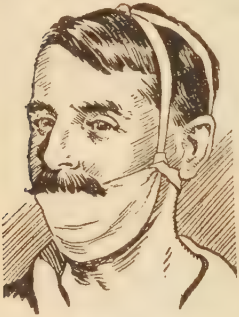


BANDAGE. Use of a double roller "capelline" bandage for a head injury; one roll is brought round the head and the other across the top

If the rolls are of the same size, one should be unrolled for a couple of feet, the slack being taken up by the other. The operator stands behind the patient. Taking the larger roll in his left hand and the other in his right, he applies the bandage to the centre of the forehead just above the nose. The two rolls are then brought round above the ears till they meet below the prominence at the back of the head. The left-hand roll is now taken with the right hand and carried above the right roll, this being carried forward across the middle of the head to the lower part of the brow and fixed there by the original left roll, which is carried round across the forehead for this purpose. The original right roll is then brought to the back of the head to one or other side of the central piece of bandage, but overlapping it. At the back of the head it is again caught by the bandage encircling the head, and then carried across the head on the other side of the central bandage, to be fixed again in front and brought back on the other side. It is thus alternately applied to one side and the other till the scalp is covered in, when both rolls are curved round the head and tied off above the nose.

In applying the capelline, it is necessary to be careful that the bandage is kept low on the forehead and well below the prominence at the back of the head, otherwise it is apt to slip off.

The widths of bandage most suitable for various parts in an adult are as follows: head and neck, 2 to 3 inches; arm and shoulder, 3 inches; forearm and hand, 2 inches; fingers, 1 inch; chest and abdomen, 4 to 6 inches; groin, 4 inches; thigh, 3 to 4 inches; leg, 3 inches.



BANDAGE. Four-tailed bandage over a chin dressing

In the use of roller bandages certain rules must be carefully observed in addition to those already mentioned. Do not apply a damp bandage, as it will shrink on drying and may constrict the part. Apply the turns with uniform pressure and parallel with each other. Do not reverse over a sharp, bony edge. When bandaging the limbs, the points of the fingers or toes should be left free to make it possible to ascertain that the circulation in the limb is not being impeded. This is done by pressing the nail so as to blanch its bed, and noting whether the blood returns at once, as it should do, when the pressure is removed. In taking off a bandage do not attempt to roll it up in the process, but gather the slack into a bundle, which is carried round and round the limb in unrolling. No attempt should be made to reapply a bandage without removing it completely and again making a firm roll of it. Machines are made for rolling bandages, and are a great convenience when a considerable number of bandages are in use.

T-Bandage. A T-bandage is used for supporting a dressing on the perineum. The horizontal portion goes round the pelvis just below the upper rim of the hip bones. A sufficient length of 3 to 4-inch roller is cut off, and to the middle of this the vertical portion is attached. It is better if the latter be slit down as far as the perineum, where its two portions are tied in a half-knot to prevent the slit going further. Each portion is then brought forward and attached to the girdle part at the groin on each side.

Four-tailed Bandage. A four-tailed bandage is used for keeping dressings on the chin. It is made by taking about 1¼ yards of a 3-inch roller. A longitudinal slit about 3 inches long is made in the centre, and the bandage is then slit down on either side to about 6 inches from its centre. The central slit is applied over the dressing on the skin. The lower two tails are then taken and knotted in front of the vertex or uppermost part of the head. The other two are taken round, tied over the nape of the neck and the long ends are each tied to the corresponding upper tails.

Many-tailed Bandage. It is sometimes a convenience to cover in dressings by means of a many-tailed bandage. This is made by taking a piece of 3-inch bandage, sufficiently long for the purpose required, for the leg, for example, from the heel to the back of the knee; or, for the abdomen, from the bottom of the spine to the top of the small of the back. Along this piece of bandage are attached, by stitching, a succession of cross-pieces, which should be long enough to go round the part and overlap, allowance being made for any dressings which may be necessary. When applying the bandage the central length is placed down the middle of the back of the part, and the lowest two ends are brought forward and crossed, and so on, in succession with the other cross-pieces, the ends of the last two being fixed with a safety pin.

IMMOVABLE BANDAGES. Bandages are sometimes impregnated with plaster of Paris, starch and other substances, and applied wet, so that a firm casing for a part of the body is formed when the material hardens. The plaster of Paris bandage is of coarse muslin, the meshes of which are filled with the plaster. It is used on a limb when it is desired to keep a joint at rest or maintain a fracture in position. It is also used to form a jacket to give support to the spine in cases of Pott's curvature.

The part is washed and dried and dusted with boracic acid powder. A flannel bandage is then applied. The plaster of Paris bandage is thoroughly soaked in warm water and laid over the flannel. It should be applied as obliquely as possible, and the more figures of eight there are the better. Three or four layers should be put on, and over all some of the plaster from the vessel in which the bandage has been soaked. The bandage is then allowed to set, the limb or other part meanwhile being kept in the correct position.

BANTING. A method of treatment of obesity is known as Banting's System. It was popularised by an extremely fat man, so fat as to have to go downstairs backward, named William Banting, who addressed a letter to the public on the subject. Everything else having failed, Banting was advised by a Dr. Harvey to cut out from his diet bread, milk, butter, potatoes, and sugar, upon which he had hitherto principally lived. In their place he was recommended to take lean meat and fish, any vegetable but potatoes, plain tea (that is, without milk or sugar), a little fruit and a little wine.

Probably the only improvement that might be suggested on this diet today would be the substitution of some other drink for the wine. But any cure of this description should only be tried under medical observation, as, like all systems, it would not satisfy the needs of every constitution.

The system was very successful in Banting's case, as he lost over forty pounds of weight in a few months and there was a marked improvement in his general health. In some other reported cases it has proved very satisfactory, but not in all, as while it has reduced the weight the patient has suffered in general health. Some have suffered from indigestion and others from nervous symptoms of one kind and another. The system has been criticised on the ground that the large amount of protein throws an undue strain on the kidneys, and that in the gouty, who are often fat, it is likely to be harmful. See Diet; Food; Gout; Obesity; Salisbury Treatment.

BARBER'S ITCH. The popular name barber's itch is applied to one variety of "foul shave" contracted by infection in barbers' shops. Its technical name is tinea sycosis or sometimes tinea barbae. The disease is accompanied by a great deal of inflammation, beginning at the roots of the hairs, exceptional rapidity of development and boggy swellings of the skin. A good deal of matter usually forms. This disease is really a severe form of ringworm of the beard. It is well worth noting that the disease is not communicated by the razor but by the brush. This is in general true of all diseases contracted in barbers' shops.

The essential precautions against conveying infection consist in the absolute sterilisation of the implements used in shaving and haircutting, and in the cleanliness of the hands of the operator. The shaving-brush should be invariably sterilised after each occasion of use, and, as certain other methods of disinfection are apt to make the hairs of the brush fall out, it is usually necessary to employ a powerful disinfecting solution. When the brush has been thoroughly soaked in this for some time, it may be washed in ordinary tap water, and then can be used.

It is well to treat all cuts incurred at the barber's by thorough washing and the use of some mild antiseptic. The disease calls for vigorous treatment under medical supervision. Benzoic acid, salicylic acid, mercurial preparations, iodine, and other antiparasitics are used; and applications of X-rays may be of value. *See* Antiseptic; Ringworm; Sycosis.

BARIUM. The medical uses of barium, a metal in the same group with calcium and magnesium, are practically restricted to two compounds, namely, barium sulphide, which is occasionally used to remove superfluous hairs, and barium sulphate, which is often used as an opaque substance when making X-ray examinations, for example, of the alimentary tract. See Depilatory; Test Meal.

BARKING COUGH. A loud form of cough is often described as a barking cough on account of its resemblance to the barking of a dog. It is frequently met with in boys of rather nervous temperament about the age of fourteen or fifteen, and is still more frequently heard as a symptom of hysteria. A barking cough is a not uncommon event at puberty. In all cases an expert examination should be made of the nose and throat, as a cause for the cough may be found there. The treatment for loud and sensational coughing of this kind, in the absence of a local cause, consists in dealing with the nervous state that underlies it, whether by drugs, discipline, or otherwise. *See* Cough; Hysteria.

BARLEY WATER. This beverage is very frequently used in the sick-room. It has practically no food value at all, but is useful for diluting other foods, such as milk, for it has soothing, demulcent qualities, and interferes with the density of the clot in the stomach when milk is swallowed. Barley water may be made clear or thick. For the clear variety, put two tablespoonsful of pearl barley and sufficient cold water in a saucepan, bring to the boil, and strain. The blanched barley is then returned to the saucepan with 2 pints of cold water. This is brought to the boil, allowed to simmer for half an hour, and strained.

Thick barley water is made in the same way, but after bringing to the boil it is boiled gently till the quantity is reduced to two-thirds or a half. In both cases it is sweetened with sugar, if desired, and then allowed to cool. The rind of half a lemon thinly peeled may be boiled with the barley, and after straining the juice is added. When prepared in this way it is not, of course, mixed with milk. Barley water only keeps for a few hours and should not again be brought to the boil. *See* Beverages: Invalid Cookery.

BARLOW'S DISEASE. *See* Scurvy.

BARRENNESS. *See* Sterility.

BASEDOW'S DISEASE. *See* Exophthalmic Goitre.

BASILICON OINTMENT. An ointment composed of 8 parts each of resin, yellow beeswax and olive oil, and 6 parts of lard, is known as basilicon, or resin ointment. It is a slightly antiseptic stimulant, and forms a good application for sluggish ulcers. The addition of 20 grains of salicylic acid to the ounce makes it an effective remedy in many cases of pruritus ani, or itching round the lower end of the bowel.

BATHING. The value of sea bathing lies pre-eminently in its stimulating effect on the nervous system, this being brought about by the sense of adventure, the novelty, the contact of the air, the water with its salt, the breaking of the waves, the sunshine and, where possible, the company. A sea-water bath falls short of open-air sea bathing in some of these respects, and a bag of sea salt in a bath at home, though not to be despised, falls very far short.

There is a general tendency to prolong a sea bath unduly. The length of a bathe must be determined in the first place by the temperature of the water. When it is cold the bather should not stay in more than two or three minutes, whereas in happier climes he may stay all day. Other things being equal, the swimmer may always stay in the water much longer than the non-swimmer.

In general it is safer for pregnant women not to indulge in sea baths. On the other hand, it is now known that patients suffering from the early stages of consumption may greatly benefit by sea bathing, though due precautions must be observed. The patient must be absolutely free from fever, and he must not be exhausted by his bathe. Other conditions in which sea bathing is very beneficial are general lack of tone, nervous indigestion, bloodlessness, asthma, rickets in children, and all forms of tuberculosis. In general, sea baths are very useful in accustoming the skin to changes of temperature and damp. Thus, people who are accustomed to sea bathing will not catch cold or suffer from local rheumatism when subjected to conditions which certainly produce these troubles in other people.

The water should not be entered when the skin is very hot and perspiring, nor when one is very hungry, nor immediately after a meal. An hour or two after a meal is the best time for bathing. The ideal bathe is when every part of the body is alternately subjected to a sun bath and to a sea-water bath.

In introducing children to sea bathing, care must be taken to respect the natural fear of a child. Nothing annoys the physician more than the stupid and cruel performances constantly to be witnessed at the seaside in summer-time. If a child is frightened, not only does he gain no benefit from his bathe, but his nervous system, instead of being stimulated, is made the victim of shock. This may lead to all sorts of disorders, besides perhaps making him dislike sea bathing for the rest of his life through the effects of early association.

Most fatalities in bathing are probably due to fainting, induced by a state of health which unfits for bathing, to excessive chill or fatigue, or to some other circumstance. Cramp may occur, and when it does the swimmer ought to turn quietly on his back and float. Care must be taken to protect the ears by cotton wool plugs or otherwise in diving from any height, and the same precaution should be taken by those suffering from chronic discharges from the ears, if, indeed, they bathe at all. *See* Exercise; First Aid.

BATHS. Nowadays we hear of sun baths, electric light baths, air baths, sand baths, and so forth, but first place in this article shall be given to the simplest and oldest and most important kind of bath. It consists of water.

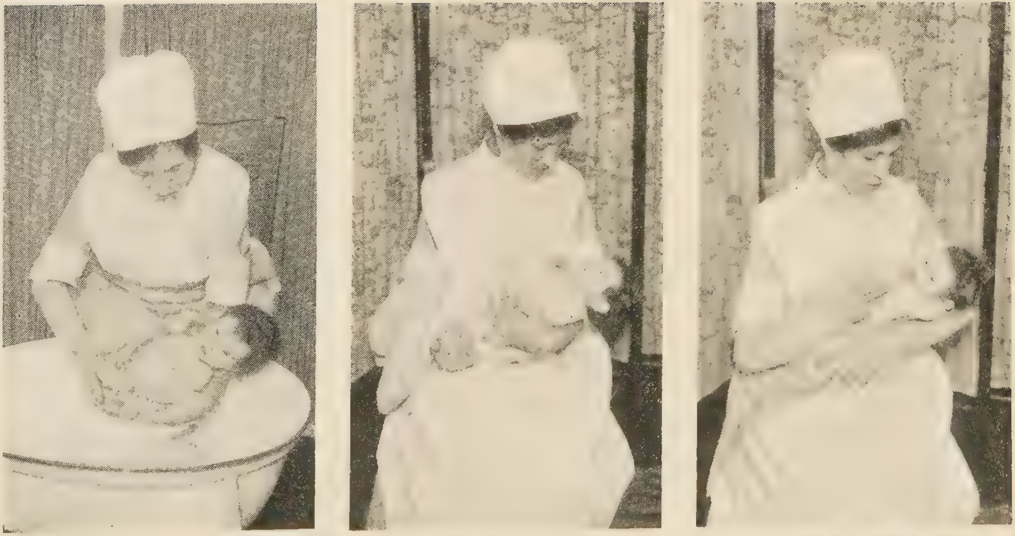
A cold bath (32°–70°F.) has very simple properties. It mainly abstracts heat from the surface. This process can only be continued for a very brief time without danger, and in general the law may be laid down that the value of a cold bath is in inverse proportion to its length, that is, the shorter the bath the more useful it is. It stimulates the skin, through the skin the whole nervous system, and through the nervous system the whole body. Anyone who takes a cold bath and does not experience a reaction of " glow " has not benefited by it, but, on the contrary, has been weakened.

Cold baths are not for the feeble, nor, generally speaking, for elderly people. The bather should not spend longer than two

The baby's eyes, nose and mouth are washed with cold, boiled water

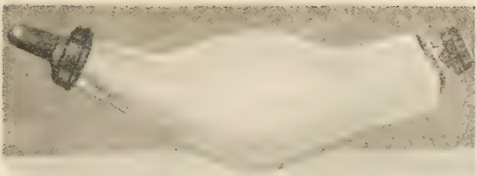
The temperature of the bath water (95° F. for a baby six months old) must be tested with a thermometer

THE BABY'S TOILET: TWO STAGES



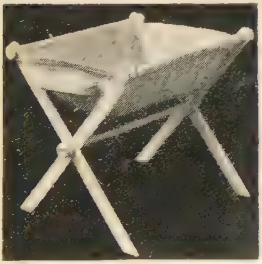
Left. How to put the baby into the bath. Very little soap is used. Centre. A baby should never be held with head and neck unsupported. Right. Correct method of holding a baby, the head well supported

CORRECT METHOD OF BATHING AND HOLDING A BABY

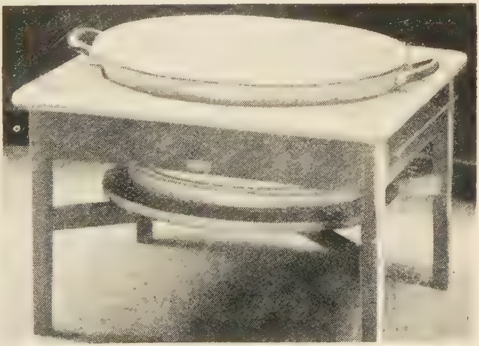


Left. Hygienic boat-shaped feeding bottle with rubber teat at one end and valve at the other

Right. Hamper basket in wicker with tray in which to keep the toilet requisites
Treasure Cot Co., Ltd.

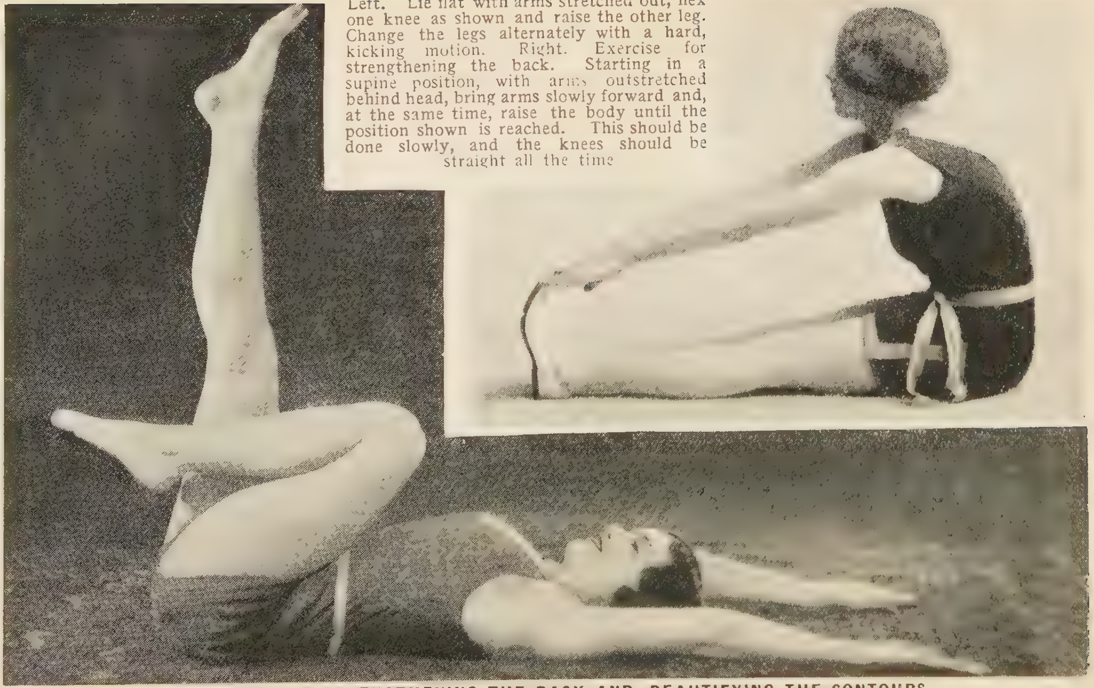


Folding bath of rubber on a light wooden frame
Treasure Cot Co., Ltd



Right. Enamel bath which fits into a stand at a convenient height for bathing the infant
Our Homes and Gardens

BOTTLE, BASKET AND BATHS FOR BABY



Left. Lie flat with arms stretched out, flex one knee as shown and raise the other leg. Change the legs alternately with a hard, kicking motion. Right. Exercise for strengthening the back. Starting in a supine position, with arms outstretched behind head, bring arms slowly forward and, at the same time, raise the body until the position shown is reached. This should be done slowly, and the knees should be straight all the time

EXERCISES FOR STRENGTHENING THE BACK AND BEAUTIFYING THE CONTOURS minutes in his cold bath. So long as the water is sufficiently below blood heat, say 40° F. at most, the bath will be stimulating, and the use of unwarmed tap water in freezing wintry weather may be very unwise. For choice, he should employ cold water only as a shower at the end of a warm bath, and then he should dry himself quickly and thoroughly with a very rough towel, so as to assist the coming of the " glow " or reaction. If the hands and feet are blue and cold after the bath, cold sponging while standing in warm water may be tried instead, but it may be necessary to restrict oneself to cold sponging of the neck and shoulders.

Water of a warmer temperature is, of course, necessary for cleansing purposes, and it should be combined with a free use of soap and friction. Very hot water, as hot as the skin will permit, has a stimulating effect, if used only for a short time. It soon becomes debilitating, as does a hot bath (about 106° F.) or a warm bath (98°–100° F.). A hot bath should not be continued for longer than ten minutes. Hot baths promote the flow of the sweat, but this is more safely attained by other means, such as the hot-air bath.

Baths have important medical uses. Cold water is very frequently and widely used as a means of reducing the temperature in fever. When the temperature shows a tendency to rise above 103° F. the patient may be sponged with cold or tepid water, sponging a part of the body at a time and avoiding unnecessary exposure. In the condition of hyperpyrexia, 105·8° F. or over, when life is endangered, apart from anything else, by the height of the temperature, cold baths are necessary, and the water may have to be chilled by the addition of ice. When a patient is in a bath of this kind a close watch must be kept on the temperature and when this has sunk to within two or three degrees of normal, he must be taken from the bath, for the temperature continues to sink after removal from the bath.

Tepid baths (80° F.) or warm baths are exceedingly valuable in the treatment of the convulsions (q.v.) of children, usually called fits. A warm bath, about 100° F., is an important adjunct in the treatment of severe burns. It helps to mitigate the shock which is frequent in these cases, especially when the burn involves the trunk ; and it is a great help in removing clothing. Children should be put into such a bath at once pending the arrival of a doctor. The same applies to the collapse which may occur in infantile cholera and severe diarrhoea.

Very hot baths may be occasionally used for a very short period of time in cases of muscular feebleness, and are sometimes useful in the form of local baths, applied merely to one part of the body, such as a painful joint. Various kinds of douche baths are of real value. They may be employed either at various temperatures or with rapidly varying temperatures, as in what is called the Scottish Douche. Many conditions of the joints are often relieved by local douches, as are also various conditions of the lower part of the bowel, such as piles.

The Turkish bath is really a general hot-air bath, and in contrast with it there is the local hot-air bath, which is perhaps more effectual than any other means in relieving the pains of chronic joint disease. The details of the Turkish bath need not be described. The point to remember is that the air of the bath is dry, so that the perspiration can freely escape from the skin. This is the difference between the Turkish bath and the vapour bath. The latter cannot be endured at a temperature higher than about 120° F., whereas the Turkish bath can be endured at a hundred degrees higher than this. In the case of local hot-air baths the temperature may even be raised to 300° F. A similar bath may be taken at home by using one of the portable baths on the market.

Turkish baths are of value for two reasons. First, no other bath is so cleansing. Secondly, a Turkish bath is very valuable as a stimulant to the circulation, especially the circulation through the skin and through the extremities of the body. In a great many diseased conditions, such as gout and Bright's disease (q.v.), in which the body contains poisons which need to be got rid of, Turkish baths are very valuable in enabling the skin to come to the aid of the other organs concerned with the process of expelling the poison. After a Turkish bath the greatest care must be taken against exposure.

Baths of water containing carbonic acid or other gases, represented by those of Nauheim in Germany, appear to have a specially beneficial action upon the heart. Artificial Nauheim baths can be quite easily and cheaply prepared by the addition of certain salts to the ordinary bath. Sulphur baths are made by adding two to six ounces of potassa sulphurata to thirty gallons of water. The sulphur is dissolved in boiling water and then added. Such baths are used in skin diseases and for rheumatism.

Alkaline baths, made by adding six ounces of washing soda to thirty gallons of warm water, may be useful in relieving general pruritis or itching of the skin. They are also used in rheumatism, though it need hardly be said that one cannot introduce drugs into the body by a medicated bath of water.

The addition of mustard to a warm bath adds to its effectiveness in many conditions, for example, in baths for children suffering from convulsions and other complaints. The mustard should be first made into a paste with cold water and then put into the bath, a half to one ounce to the gallon. The addition of a tablespoonful to a footbath is a useful treatment for an oncoming cold, and the same amount added to a hip bath may be of value in some cases of dysmenorrhoea.

In many sanatoria for tuberculosis and other diseases, sun baths, or the exposure of the body to sunlight, have been found very valuable in restoring the health of the patient, improving the quality of his sleep, his appetite, and his digestion. It has been demonstrated that sunlight can prevent the development of rickets, even when the diet is such as will lead to the disease. The value of sunlight in cases of tuberculosis is enhanced by sea bathing.

The use of baths in many complaints is much more beneficial when combined with massage, the application of electricity in various forms, and a regulated régime of diet, exercise, and rest. The advantage of spas is that all these things are provided for and readily available ; and there is also the important factor of a change from the surroundings and responsibilities of everyday life and work. *See* Douche ; Electricity in Medicine ; Health Resort ; Light ; Massage ; Mud Bath ; Radiant Heat.

BATH SALTS. A small variety of crystal suited for bath salts may be made by crushing equal parts of ordinary washing soda and borax and sifting until the crystals of one size are separated. These are then perfumed by spraying over them a solution of ionone (artificial violet), ½ dram, in spirit, 1 oz., this being sufficient for 2 lb. of crystals. A tablespoonful may be added to a full bath or a teaspoonful to a hand basin.

BAY RUM. In cases of greasy scalp and other conditions, bay rum is a useful application. It owes its scent to the leaves of the bay or laurel from which it is prepared, and its cleansing properties to the large quantity of alcohol it contains.

BEARD. Common diseases which affect the beard and whisker area are dealt with under the headings Acne, Barber's Itch, and Sycosis.

BEAUTY AND BEAUTY CULTURE

General Rules and Modern Methods for the Improvement of Personal Health and Appearance

Information on Special Aspects will be found under Ankle; Diet; Face; Figure; Hair; Hand, etc.

Want of daylight, fresh air, and exercise, improper diet and laziness are beauty's enemies. A short walk can generally be managed daily, and five minutes devoted to the following simple exercises will improve the circulation and the digestive organs and strengthen the body.

(1) Stand with feet slightly apart, head thrown back, and bring both hands so that the backs come under the chin, fingers pointing forward, elbows close to ribs. Send hands up and out in front, as in the breast-stroke in swimming, then separate them gradually, sweeping them back and down as far as they will go. Then draw elbows up to the sides again. With these arm movements goes a trunk and leg part. Crouch low and bring the hands under the chin as described. While rising to an upright position, finishing on the tips of the toes, send the hands out in front, as described. Then beginning to crouch again, send the hands

back and down, bringing them once more under the chin when quite crouched. Repeat six times. This exercise keeps the body supple and expands the chest.

(2) A trunk twisting exercise for strengthening abdominal muscles and reducing the waist: stand with feet apart and arms stretched over head. Bend forward to touch right foot, keeping knees straight, then describe a circle with arms and rotate body to left, letting the trunk twist from the waist and bending well back as arms come up and go down again to the right foot. Repeat the movement several times and then reverse direction, bending to left foot and circling towards the right.

(3) A bicycling movement to flatten abdomen should be taken easily at first: lie on back with arms stretched out behind head, both knees drawn up towards chest. Raise right foot, but keep knees close together, and pedal with the feet (Plate 8).

(4) To combine stretching with strengthening the whole spine, lie on back, with arms at sides. Slowly raise arms, and extend above the head. Stretch the whole body and rise to sitting posture, taking care to let head follow shoulders and not come up first with a jerk. Then in slow continuous movement touch the toes with both hands. Do not bend knees. Relax whole body and repeat exercise. At first it may be necessary to do the sitting up part of the exercise with feet hooked under a steady piece of furniture (Plate 8).

(5) A more strenuous exercise for strengthening both back and abdomen consists in lying flat with hands at waist and then raising head and shoulders and the feet about a foot from the floor.

The benefit to be derived from outdoor sports besides muscular development is the natural promotion of perspiration, thus eliminating poison from the system. In order to obtain full advantage from such activity of the pores, on returning home rub the body briskly with a flesh glove and take a tepid bath.

Care of teeth cannot be too much insisted on. In themselves they are an important point of beauty or the reverse, and proper mastication is essential to good digestion. Regular visits to the dentist and brushing the teeth night and morning should not be neglected.

Diet is the next factor to be considered. Too great restriction in the case of normally healthy people is not to be encouraged. Plenty of green vegetables, fresh salads, and sound ripe fruit supply the important natural salts, which keep the blood healthy, and therefore help to secure a good complexion.

An excess of foods containing starch, sugar or fats should be avoided when there is a tendency to put on flesh. For older people the mistake of drastic measures for reduction is that after youth the skin loses elasticity and when the flesh under it is reduced the stretched skin bags and wrinkles. Scragginess, which comes from malnutrition caused by indigestion, together with the flaccid sagging of the muscles caused by lack of healthful exercise, is equally to be guarded against.

Alcohol has a coarsening effect on the texture of the skin. Also, coffee, tea, or cocoa must not be indulged in to excess; the first two stimulants often causing indigestion, with flushing or sallowness as a result, and the latter overheating and liver clogging. Roughness, blotchiness and redness of the skin are usually caused by acidity. In addition to the elimination of poisonous acid by perspiration and avoiding sugary and starchy foods and acid fruits such as currants, strawberries, plums, etc., the habit of frequently sipping a glass of water before meals and at night should be cultivated—an internal bath, cleansing the system of many impurities. Constipation should never be allowed, but drugs should only be taken on the advice of a doctor, as promiscuous dosing may have harmful results. Eating between meals is a mistake. The digestive organs require a rest. Constant chewing of sweets spoils the shape of the mouth, and over smoking is detrimental to clear eyes.

There are other bad habits to be avoided or corrected. In walking, too short or too long a step is tiring and throws out the balance of the body. A stride should suit the length of leg; there should be a free swing from the hips without wobbling, and steadiness of the shoulders. When standing an incorrect attitude is to thrust one hip outwards and distribute the weight of the body unevenly. A bad habit in sitting is to flop down so that the end of the spine, instead of supporting the body correctly, is curved under. As this, if it be continued for any length of time at a sedentary occupation, causes a strain on the internal organs, backache, a stoop, and restricted breathing, it is most important to practise sitting upright, the base of the spine touching the back of a chair and the head in line with the body. When resting it is better to lie down flat than to loll in a chair.

Screwing up the eyes is sometimes imitative, and should be checked; where caused by eyestrain, glasses should be worn.

Hair should be combed out at night, but vigorous brushing has a more beneficial effect when the body is not tired. If the hair begins to come out a good tonic should be used. Dandruff must be prevented; it is impossible to have beautiful hair unless the scalp is kept clean. Most hair, if properly brushed, has sufficient gloss without recourse to brilliantine.

Cosmetics have a place in beauty culture, their use being to preserve, whiten, smooth, and brace the skin. To keep the contour of the face and the elasticity of the skin a simple form of massage may be gone through daily, after the physical exercises in the morning, as muscles relax during sleep and want bracing.

Place the elbows firmly on the dressing-table and with the hands covered with skin food, using the flat ball and palm of the hand, begin at the point of the chin and work upward and outward across the cheeks to the ears and temples. Do not drag the skin or rub it, but knead and lift it. Massage round the eyes should be soft, regular stroking above and patting below, as the skin here is very easily stretched. Clench the fingers together loosely and place the fists against the under part of the chin. Move the hands apart along the jawbone, alternately pressing or lifting in four or five steps (Plate 9).

After the massage the face should be bathed in cold water to which a little eau-de-Cologne has been added.

Soaking daily in a hot bath enervates instead of bracing the muscles. A quick warm bath, using a long-handled bath brush and followed by a cold sponge, keeps the skin in good condition. On alternate nights cold cream and an astringent complexion milk, such as a cucumber and benzoin preparation, should be applied. The first should be lightly rubbed and tapped in, thus avoiding the danger of stretching the skin, and any superfluous cream wiped off; the second should be dabbed on with cotton-wool and allowed to dry in, thus alternately feeding and toning up the skin. The neck should be treated with the same preparations. Before applying these at night, the skin should be cleansed with a pure soap and hot water.

Make-up is somewhat a question of fashion, but should also be one for the individual, emphasising good points and glossing over bad, not a meaningless routine of cosmetics. Artificial colour may be unnecessary, because by following hygienic rules, sallowness and the whiteness of anaemia will be corrected. The clear, healthy pallor that is natural to some complexions is a beauty and should not be rouged. When colour is used the shade must be chosen to suit the skin, the smallest quantity applied lightly to the upper cheek bones with absorbent wool if a powder, or with the tip of the finger if cream or liquid, and the face powdered afterwards. With regard to the lips, lipstick should tone with rouge or harmonise with natural colour. Castor oil used every night, applied by a camel-hair brush, has a darkening and strengthening effect on lashes and eyebrows. Should touching up be desired use mascara unobtrusively.

Sensitive skins may develop a rash from washing in unaccustomed hard water away from home, and a cleansing cream may then be used instead of soap and water. It is most important to select the right cream, soap, and powder for the individual skin; once these have been discovered they should be adhered to. A silk-sifted pure rice powder delicately tinted to tone with the natural skin is the safest and most becoming.

Sound sleep in a well-ventilated room is important. It is in fact one of the best beauty specialists in the world. When late hours have to be kept at night, if possible make up arrears of sleep in the afternoon.

BED BUG. These insects are of a brownish colour, very flat and from a twelfth to a fifth of an inch long. The female lays her eggs in the beginning of the summer, and these are glutinous at first, so that they readily adhere to whatever they are deposited on. The body of the insect emits an offensive odour when touched. Some people are not affected by the bites, but others suffer from irritation, itching and wheals. It is now known that the bug might transmit relapsing fever, the germs of which, being taken up when biting an infected person, are introduced into others whom it may bite.

Infested premises must have the flooring and skirting-boards sufficiently removed to permit of the breeding places and surrounding woodwork being treated with crude creosote or tar. Wood bedsteads and other furniture should be washed thoroughly with soft soap, after which turpentine is applied to the crevices and joints. A thorough sulphur fumigation will dispose of bugs in a room. Clothing may be soaked in disinfecting solutions such as lysol. Kerosene provides another useful means of dealing with bugs. For the irritation of the bites diluted toilet vinegar, ammonia, or a saturated solution of bicarbonate of soda may be used. *See* Bite ; Disinfection.

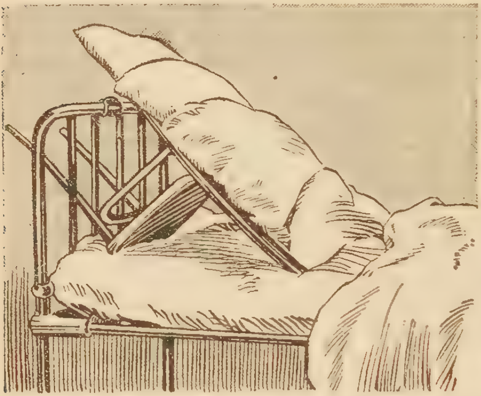
BED CRADLE. In certain cases it is necessary to make use of a cage, known as a bed cradle, to take the weight of the bedclothes off a patient, for instance, in fractures of the lower limbs, in painful abdominal conditions, and so on. This consists of three metal or wooden struts to which are attached three or more metal hoops. The cradle can be utilised in giving a hot-air bath to a part, and an ice bag can be suspended from it in appendicitis and other abdominal conditions when any pressure on the part causes pain (*see* Plate 17). In an emergency, stools or something of the kind will serve the purpose.

BED PAN. When patients, either from weakness or other causes, are unable to get up, a bed pan must be employed. There is no doubt that the bed pan is not used frequently enough in cases of heart disease, of extreme weakness due to many causes, and even in certain cases of varicose veins which have become complicated by the clotting of the blood in the veins. In such conditions serious harm may be done by the assumption of the erect attitude in getting out of bed, even if it be only for a few seconds. Before use the pan should be warmed and the margin covered with flannel. After use it should be emptied and cleansed as soon as possible, and in many cases it is desirable to use a disinfecting solution for the purpose.

BED REST. It is often necessary to have an appliance to prop up an invalid in bed, for example, in heart disease. This can be improvised in an emergency by putting a chair upside down into the bed and placing cushions or pillows along its back as shown in the illustration in the next page. If it should be required for a long period it is more satisfactory to purchase a properly made apparatus.

BED SORE. A bed sore may seem to be a very unimportant and trivial malady, but the beginning of a bed sore very frequently marks the last stage in a chronic illness, its appearance turning the scale against the patient. It is infinitely easier to prevent a bed sore than to cure one; and there are certain conditions in which it may be said that a bed sore once started is practically incurable. It will then certainly hasten the fatal termination of an illness.

It may be taken as a good working rule that inefficient nursing is more or less responsible for the occurrence of nearly every bed sore. It is a state of local inflammation of the skin, the immediate cause of which in every case is pressure. Attention must be directed to the word immediate, as it is the state of nutrition of the skin that determines whether a given amount of pressure will or will not produce a bed sore.



BED REST. Showing one improvised from a turned-up chair

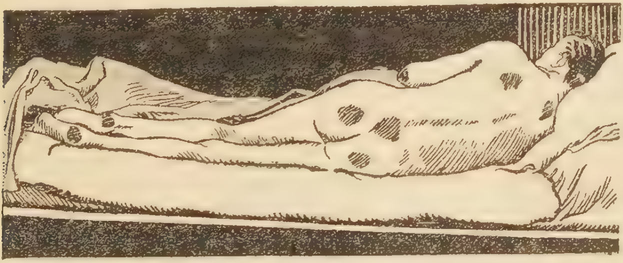
The patients in whom the occurrence of bed sores is to be guarded against are those in whom the skin is weakened, owing either to general or to local causes. Amongst these are old age, various kinds of fever, especially typhoid, Bright's disease, heart disease, and diabetes. In most of the cases named the state of nutrition of the skin has been weakened by the weakness of the circulation through it. But, on the other hand, there are a large number of cases where the skin has been weakened, not so much by any defect in the circulation as by some defect in the nervous apparatus by which the health of the skin is maintained. Hence it is that in many cases of nervous disease, paralysis and insanity, bed sores are so exceedingly liable to form.

The most important and perhaps the most frequent site of bed sores is in the skin immediately over the sacrum or termination of the backbone. When a patient is lying in bed on his back, if his skin has been weakened by any of the causes we have named, and if his illness has removed the buffer fat that should lie between his skin and his skeleton, a bed sore is only too likely to form on the site named. The other sites most frequently chosen are in general just those places where the skin lies immediately over a bony point that is subjected to constant or frequent pressure, such as the tips of the heels, the shoulder blades, and the elbows.

Properly speaking, there are two kinds of bed sores, namely, the acute and the chronic. The acute bed sore is far less frequent, and only occurs as a result of grave disease, such as the late stages of general paralysis, apoplexy, etc. It is with the chronic bed sore that we are concerned.

Everyone who has any responsibility in connexion with the nursing of the sick or the care of the aged should be able to detect the earliest signs of an approaching bed sore, and should be fully aware of the grave responsibility that attaches to their neglect at this early and apparently insignificant stage. The beginning of a bed sore is simply a local darkening of the skin due to the arrest of the circulation through it. This is scarcely the same as a darkening due to a bruise. It fades away more gradually at its edges, and has a dusky, sullen, purple-red colour which gradually darkens. The skin surrounding the darkened area is boggy and pits on pressure, that is to say, the mark of the pressure of the finger leaves a little pit which takes some time to disappear.

If the condition is not arrested, the injured area of skin will die, and will thereafter be separated, leaving a raw area of very weak vitality, which discharges a little thin matter. There may be little or no pain at this stage. Obviously one great danger of bed sores is that the skin may become infected by microbes, and thus give rise to a blood poisoning which is quite sufficient to carry off a patient already weakened by chronic disease.


BED SORES. The sites at which they are most likely to occur

The prevention of bed sores is to be achieved first of all by the recognition of their liability to occur in certain classes of patient, by the recognition of the causes which produce them, and by the responsible appreciation of their possible consequences.

Whatever the disease or cause for which a patient remains in bed, it is the duty of those who are tending him to see that his position is sufficiently varied. This is a good general rule to be applied to all cases save those few in which it has been specially ordered that the patient is not to be moved. There is no need to make violent changes of position. A great deal can be done by judicious play with a little cushion, placed now in the small of the back, now under the shoulders, now elsewhere; even the bending of the knees or the straightening of them may make all the difference; and of course the patient should be rolled about from side to side at reasonable intervals and in reasonable degree. In the worst cases a water bed may be required. Other local means may be adopted to take pressure off the part. Little rings of cotton wool, for instance, may be placed upon the bone of the ankle, or water cushions or air cushions may be employed.

At least once a day the parts most liable to suffer must be carefully and gently washed, thoroughly dried and then rubbed —it is assumed, of course, that there is no sign of a bed sore at this stage—with methylated spirit or some other strong preparation of alcohol which is allowed to dry. It must further be remembered that, however dry the skin be kept after washing, it is always perspiring and therefore wetting itself. Perspiration not only softens and weakens the skin, but is apt to constitute an excellent nutrient juice in which microbes may develop. The skin should be kept dusted with some antiseptic dusting powder such as boracic acid. This not only absorbs the moisture which is secreted by the skin, but also interferes with the growth of microbes. Finally should be noted the importance of keeping the sheets dry and free from wrinkles, crumbs and the like.

The treatment of bed sores is a matter for the surgeon, but it may be said that when a bed sore is actually threatening the treatment often is to paint the surface with flexible collodion and to move the patient so as to take pressure off the part. If the skin dies, boracic acid fomentations covered with oiled silk are used frequently to encourage the dead part to separate off. When this has happened the sore may be dressed with Friar's balsam, or with some such ointment as the following: resin ointment and balsam of Peru, one ounce of each; or ten grains of camphor in one ounce of zinc ointment. *See* Nursing.

BED-WETTING. A habit of wetting the bed during sleep, after the age when one expects sufficient control of the bladder to prevent it, say, from three years onwards, calls for the remedying of various causes of possible irritation. Fluids should be restricted or abstained from altogether, in most cases of the complaint, for a few hours before bed-time. Condiments, mustard, pepper and sauces, should be avoided. A tight foreskin or adenoids should be dealt with surgically. Constipation must be corrected, and threadworms cleared out if present.

The child should be made to empty the bladder before going to bed and should be waked to do so again after about an hour's sleep. As the accident usually happens when the child lies on the back, an old-fashioned preventive is to fasten a reel on the small of the back with a tape round the waist, so that the child wakes if it turns on its back. The medicinal remedies for the complaint include belladonna, hyoscyamus, hexamine, alkalies and thyroid extract. In some cases hypnotism effects a cure. Punishing a child, in the great majority of cases, is about the worst thing to do.

It should be remembered that the habit may be due to such serious disorders as stone in the bladder, tuberculosis of the bladder, kidney disease, diabetes and epilepsy. *See* Belladonna.

BEEF EXTRACT. An extract made from lean meat is now amongst the most widely used additions to the diet of convalescents or invalids. It contains a negligible amount of food matter, mainly consisting of what are called extractives, that is, substances of a special chemical class derived from muscular tissue by heating it under pressure with a little water. By exciting the secretion of the digestive juices of the stomach, extract of beef not only aids digestion very markedly, but also stimulates the appetite. Beef extracts are useful flavouring agents in general cookery, and, when giving white of egg to an invalid, the addition of a little meat extract confers palatability on it. They should be avoided by the gouty and those with kidney disease or thickened arteries.

BEEF JUICE. There is a wide difference between a beef extract and a beef juice. The former, while it has an important use as a digestive stimulant, has no food value, but beef juice really consists of the juice of the meat from which it is made, that is to say, consists of the fluid part of the muscular fibres. Beef juice may be prepared by a manufacturer on a large scale, or at home, and constitutes a food which may be of very great value to infants and invalids.

There are several ways of obtaining raw beef juice. The best is to chop up the meat, place it in cold water and leave it to stand in some cool place. The water gradually enters the beef and causes it to swell, and when the pulpy beef is taken and squeezed in muslin the juice is readily obtained. It is, of course, somewhat diluted with water, but there is no loss, and the juice is more completely extracted by this method than by any other that can conveniently be employed at home. Its use is justified both on the grounds that it is a true food and also because of its stimulant action upon the digestion. A little raw beef juice also may be given—say, a teaspoonful once a week—to babies who are being fed upon sterilised or artificially prepared milk. *See* Diet; Invalid Cookery.

BEEF TEA. There are a number of methods of preparing beef tea, and the character of the beverage varies according to which of these is selected. The best method will be given in detail, following closely the description given by a leading authority, Dr. Robert Hutchison.

The beef must be lean and completely free from gristle and fat. It must be scraped with the back of the knife so as to reduce it to shreds. The object of this is to separate the muscular fibres which contain the nourishment from the non-nutritious connective tissues which hold them together. The shreds are to be placed in a jar and mixed thoroughly with water. The proportions usually suggested are one pint of water to one pound of beef, but this is largely a matter of taste. If this mixture is left alone, there will soon be produced a very dilute beef juice. The jar should now be tightly covered and gradually heated, for at least an hour, in a saucepan of water reaching about three-quarters up the jar. The temperature must be kept below the point at which the valuable constituents of the fibre are apt to solidify, namely, about 167° F.

The tea is now made, but it is not cooked ; it still has the raw red colour and taste, and it must therefore be rapidly boiled and then removed from the fire. The tea must be poured off without straining, and the lumps of beef squeezed in a strainer and the product added to the tea. It is important to note that the tea must not be strained, for the most valuable part of the preparation consists of a number of tiny light particles which settle in a layer as the beef tea cools and which would all have been kept back had the tea been strained.

Beef tea constitutes a change where a patient is confined to a fluid diet, but its percentage of albumin or protein or true food matter is exceedingly small. However carefully the beef tea be made it can never contain even 2 per cent of protein.

Of somewhat greater food value is what has been called whole beef tea, to which the finely powdered fibres of the meat have been added and in which they are held suspended. Furthermore, actual beef powders may be added to beef tea, and so may various other foods, such as baked flour. In such a case the beef tea is useful in persuading the patient to take more food and also in promoting its digestion. *See* Invalid Cookery.

BEER. Many beers are of real food value, quite apart from the alcohol they contain. It has been estimated that a pint of ale contains about as much carbo-hydrate food as an ounce of bread, but this must not be taken to mean that the food value of the two is equal, as bread also contains a considerable proportion of protein or tissue-forming food in the shape of gluten. Beer is taken usually to help the appetite and to quench thirst. It may serve the former purpose usefully in convalescence from acute diseases, but only the lighter forms should be used. At all times it should be used moderately.

On the Continent there is an affection known as the "beer heart," which is an overstrained condition of the organ produced by the excessive amount of liquid which has to be sent through the circulation of those who drink beer copiously. Chronic gastritis is another and more frequent consequence of an intemperate use of the beverage. It is worth noting that the use of beer and malt liquors in general is highly undesirable in all cases where there is a tendency to obesity, for this tendency is liable to be increased, first of all by the action of the alcohol, and also by the fact that the nutritive part of these liquors is especially suitable for fat formation. *See* Alcohol.

BEE STING. There is no distinction between the stings of bees and wasps, and what follows should be understood as applying to both. The reason why the sting is painful is that the insect injects into the skin a small quantity of formic acid. There are cases where bee or wasp stings have caused death, often in under half an hour. The reason for this is by no means clearly understood. It is believed, however, that the cases of serious stinging are due to the production of a special poison by the particular wasp or bee in question, a poison which possibly depends upon a diseased state of the insect. Severe cases of such an accident must be treated according to the symptoms, by the free administration of alcohol and other stimulants, and so forth.

In mild cases the first thing to do is to get rid of the sting, if possible by such delicate manipulation as will not squeeze the poison bag and so introduce more of the poison into the patient's body, and thereafter one should apply any alkaline substance, such as a weak solution of ammonia or soda, in order to neutralise the acid in the poison injected by the insect. When the sting is near the eye, or in a cavity such as the mouth or the ear passage, ammonia would not, of course, be used. Afterwards some antiseptic lotion, containing carbolic acid or any other convenient antiseptic, should be applied, or the part may be painted with tincture of iodine. This last precaution is taken to minimise the risk of infection of the wound by microbes, such as very frequently does occur as a secondary consequence of being stung by a wasp or bee. For the same reason, bleeding should rather be encouraged than the reverse, as poison may be got rid of in this way. Swelling of the throat from stings in the mouth should be treated by applying hot fomentations to the neck and giving ice to suck, but medical assistance should be sought if relief is not quickly obtained.

Deliberate stinging with bees is a form of treatment which appears to have been successful in cases of chronic rheumatism. *See* Bite; Formic Acid.

BELLADONNA. The belladonna plant or deadly nightshade is of much value in medicine, chiefly in virtue of the atropine which it contains. Whilst atropine, however, is very frequently used now by itself, there are still a large number of cases in which preparations made directly from the belladonna leaf or root may be employed. Of these preparations three may be noticed. Two of these, the plaster and the liniment of belladonna, are for external application, and are amongst the most useful of their class. Both relieve pain; often they relieve itching; and very often they relieve local perspiration, such as the tiresome sweating of the feet which bothers many people. In this last case, of course, the liniment would be employed.

The kind of pain relieved by the external use of belladonna is that which has its seat very near the surface. This definition includes the greater number of cases of neuralgia. In general the liniment is more useful than the plaster, but the latter is very often used for application to the breasts when it is desired to arrest the secretion of milk. Liniment of belladonna is combined with that of aconite and with chloroform in A.B.C. liniment, which is much used as an anodyne. The tincture of belladonna, dose 5 to 10 minims, has many uses; its chief value is in the relief of pain.

To relieve the spasms of whooping-cough and in the more severe and urgent spasms of asthma, belladonna is frequently employed, and in those cases of chronic bronchitis which tend to assume the asthmatic type much benefit may be derived from it. In whooping-cough, belladonna does not actually shorten the course of the disease, but merely makes it more tolerable. In cases of chronic bronchitis, when there is too much fluid secreted inside the lungs, belladonna tends to dry up the tubes. In oedema of the lungs, which may occur, for instance, in Bright's disease, in which the patient coughs up large quantities of frothy, watery sputum, belladonna is again useful, though the drug is usually given as a hypodermic injection of atropine.

Belladonna has another very important use, namely, in the treatment of bed-wetting in children. Other uses are for the pain of renal colic and gall-stone colic, and in epilepsy.

POISONING BY BELLADONNA. Belladonna poisoning follows a common type, whether it be due to eating some part of the deadly nightshade, to accidents in the use of belladonna, or even to excessive absorption of atropine from the belladonna plaster or liniment. In general two main facts may be noted. The first is that children are remarkably tolerant of the drug and can take relatively large doses. The second is that there is a wide gap between the dose of belladonna that will cause poisonous symptoms and the dose that will cause death.

The noteworthy symptoms of an overdose of belladonna are as follows: The throat and mouth are very dry, and hence there is some difficulty in swallowing; the pupils of the eyes are widely dilated, but the sight is blurred, especially the sight of near objects, as in reading or writing; the skin is also very dry. In a short time, if the dose is a very large one, the symptoms are still more marked: the skin becomes flushed and may even display a uniform red rash which has often been mistaken for that of scarlet fever. The pulse is very rapid. In such cases the patient's nervous system is often upset.

If the poison has been swallowed, the stomach must be emptied by means of mustard and water or some other emetic. Thereafter strong tea may be given freely, the tannic acid in the infusion acting as an antidote. Alcohol should not be given, but coffee is an excellent stimulant. *See* Atropine; Poisoning.

BELL'S PALSY. Facial paralysis is sometimes called Bell's Palsy, after Sir Charles Bell, who described the condition. *See* Facial Nerve.

BELT. *See* Abdominal Belt.

BENZOIC ACID. Occurring in gum benzoin, which is obtained from an Eastern tree, and in coal tar, benzoic acid and its salts are drugs of great value. It is a valuable antiseptic. When administered internally, either in the form of the acid itself or as ammonium benzoate or sodium benzoate, the drug seems to be rapidly removed from the body by two definite channels, the lungs and the kidneys. In each case it acts as an antiseptic, and also as a stimulant to all the passages with which it comes in contact. Hence it is very largely used in a number of diseased conditions of the lungs and the urinary system. The best form in which to administer the drug is usually considered to be the benzoate of ammonium, dose 5 to 15 grains, which is a salt readily soluble in water and not very disagreeable to take. *See* Balsam.

BENZOIN. The balsamic resin, benzoin, is obtained from an Eastern tree. It contains and has the same properties as benzoic acid (q.v.).

BENZOL. Also known as benzene, benzol is a colourless liquid obtained from coal tar. It must be distinguished from petroleum benzine or benzoline. Benzol has been used internally in whooping-cough, leukaemia and other disorders. Applied externally it will destroy lice, one application sufficing as a rule. It is highly inflammable and should not be used near a naked light. In poisoning by benzol, give an emetic and stimulants, douche alternately with hot and cold water, and, if breathing fails, employ artificial respiration. *See* Poisoning.

BERI-BERI. In tropical countries a disease known as beri-beri, and by other names, occurs in epidemics; its appearance in temperate climates is limited to isolated cases. It is characterised by a multiple neuritis, or inflammation of many nerves throughout the body, the result being, in mild cases, muscular weakness or wasting, loss of sensation in various parts, shortness of breath, dropsy on the front of the legs, and other symptoms. In this form the disease may persist for some weeks. In other cases it may assume more serious proportions, in either of two forms. It may be of the dropsical or wet type, in which there is marked dropsy over the whole body, including its cavities. In the other or dry type, the muscles waste and lose power progressively, and are very sensitive to handling.

The disease was observed to have a connexion with a diet in which polished rice bulked largely. This led to the discovery that in polishing the rice a vitamin was removed in the husk. This vitamin is also contained in whole-grain bread, in milk, eggs, yeast extract and other foods. Beri-beri, it would seem, is prevented or cured by the diet being rearranged in such a way as to include foods containing this vitamin. The administration of such foods is, therefore, the first thing in treatment, but recovery is assisted by removing the patient to roomy, well-ventilated quarters. Diuretics (q.v.) in dropsical cases, and massage in paralytic cases, are amongst other remedial measures. *See* Dropsy ; Neuritis ; Paralysis ; Vitamin.

BEVERAGE. In nursing the sick the utmost difficulty is often experienced in persuading the patient to take a sufficiency of nutritious liquids and in satisfactorily quenching his thirst. Variety in food and drink means much to the healthy, but it may be of the greatest importance to the sick. This should be secured by making a judicious selection from the beverages mentioned below. Some of these are nutritive, and when a patient is on a liquid diet an attempt must be made to get him to take a sufficient proportion of his supply of liquid in a form which will also include an adequate amount of food ; some beverages are stimulants mainly or entirely ; some simply relieve thirst ; and imperial drink, a recipe for which is given, not only relieves thirst but has a helpful stimulant action on the kidneys and bowels.

NUTRITIVE BEVERAGES. Of these the most important is milk, and it may be taken undiluted, and either hot or cold. When taken hot it may for some of the feeds be flavoured with a little nutmeg or cinnamon. In fever it is usually desirable to give it diluted, and this may be done by adding hot water, soda water, or such waters as Vichy and Apollinaris. In some circumstances the milk will be peptonised. Fermented milk, Koumiss and Kephir, are sometimes used, and there are times when butter-milk or milk artificially soured by the Bulgarian bacillus prove most grateful to a patient. Butter-milk and ordinary milk in equal quantities is a good combination. Milk may also be given in the form of one of the recipes which follow :

Rice Milk. Cook 2 tablespoonfuls of rice in 1 pint of milk very slowly for 1 hour. Pass through a coarse sieve, flavour as desired, add either sugar or a pinch of salt, and serve either hot or cold.

Milk Tea. Into a small, heated teapot put 1 teaspoonful of China tea and over it pour 1 breakfastcupful of boiling milk. Place it by the side of the fire for 20 minutes, care being taken not to let it boil. Pour gently into a heated cup, so as not to disturb the leaves and sediment, and sweeten if liked.

Gum Arabic Milk. Soak 1 ounce of gum arabic in a teacupful of cold water overnight, then heat slowly till thoroughly dissolved. Add to it a breakfastcupful of boiling milk, add sugar and flavouring, and serve hot.

Whey. Boil 1 breakfastcupful of milk and add the same quantity of cold milk. Stir into it 1 teaspoonful of rennet and set aside for half an hour. Break up the curd with a fork and strain the whey through a fine muslin. Sometimes a little lemon juice and sugar are added, or two tablespoonfuls of cream, sugar, and a few drops of vanilla.

Wine Whey. Boil 1 teacupful of milk and add to it half a teacupful of sherry and a teaspoonful of sugar. Let it stand for a minute till the curd forms, then strain through muslin into a glass and serve hot.

The following two recipes are most useful for people whose strength is much reduced; they are highly nutritive and also stimulant.

Egg Drink. Beat up an egg with a teaspoonful of sugar and a tablespoonful of sherry or a dessertspoonful of brandy. Pour over it a cupful of boiling milk and serve hot.

Egg Flip. Beat the yolk of an egg with a teaspoonful of sugar and a dessertspoonful of brandy. Pour over it a teacupful of boiling milk, stir briskly, and lastly add the white of egg beaten to a stiff froth. The brandy can be omitted and a few drops of flavouring substituted.

Albumen or Egg Water. Mix the white of an egg with a teacupful of cold water, add a pinch of salt and strain through muslin into a glass. Albumen water may be given alternately with milk, but it proves most useful when for some reason milk must be withheld, for example, in some forms of infantile diarrhoea.

STIMULANT BEVERAGES. These include tea, coffee, beef tea, and alcoholic drinks. For further particulars see the articles under the headings Beef Tea, Coffee, etc.

BEVERAGES FOR RELIEVING THIRST. The most important of this class is, of course, pure water. In some places the water supplied may contain too large a content of mineral matter to suit certain patients. London water, for example, may not agree in some cases of acute eczema. In this case a water may be substituted which has been deprived of these constituents by distillation, such, for example, as the Salutaris waters; or, instead of plain water, soda or potash or one of the natural table waters may be used.

Barley Water. Apart from water, perhaps the most generally useful beverage in the sick-room is barley water, recipes for which are given under its own heading. Nearly all invalids like barley water, either thick or clear. It is more interesting than plain water and more soothing, for the barley yields a demulcent substance which makes the beverage "smooth." Barley water is largely used to dilute milk. This it does efficiently, and it also has the virtue of making the milk solidify in the stomach in a more readily digestible form than it would otherwise take, though this may be done better by lime water, or by using sodium citrate.

Toast Water. Another beverage of the same type is toast water, which is made by breaking in pieces a well-toasted crust of bread into some fresh cold water. After a time the water is strained and is found to have a pleasant flavour and to be of a pale yellow colour.

Fruit Drinks. Among fruit drinks, lemonade is the most used. One or two kinds may be noted. The bought lemonades, whether solid or liquid, are inferior to that made from a fresh lemon, and should not be employed for invalids if the latter is available. An ordinary lemonade may be made thus: Use 4 lemons, ¼ lb. of loaf sugar and 3 pints of boiling water; mix the sugar with the juice of the lemons, add the boiling water, and cover until cold. The flavour of the mixture may be much improved by adding to it a number of very thin slices of the surface of the lemon rind, or by first of all rubbing some of the sugar on the rind until it takes up the yellow flavouring matter. It is not generally known how acceptable this beverage may be when taken hot. It is then an excellent drink for consumptives at bedtime in winter: the heat gives it some value in inducing sleep and helps to bring out the flavour.

Another form of lemonade may be made by adding lemon juice to water in which sugar has previously been dissolved, beating up the white of an egg and adding this to the mixture. The proportions are 1 lemon to 1 pint of water and 1 ounce of sugar. A tumblerful of such lemonade, containing ½ ounce of sugar and half the white of an egg, is of considerable food value.

For a change apple water may be given. Put into a jug 2 large juicy apples cut into slices, the rind and juice of half a lemon, 3 teaspoonfuls of sugar and a pint of boiling water. Let it stand till cold, strain and serve.

Imperial Drink. This may be made by simply adding cream of tartar to home-made lemonade in the proportion of a teaspoonful to the pint; or it may consist of ½ ounce of cream of tartar, the rind of a lemon, a heaped teaspoonful of sugar and 3 pints of boiling water. If it is desired to leave out the sugar, the drink may be sweetened by the addition of 1 grain of saccharine for each pint. Feverish patients may take imperial drink ad lib.

BEVERAGES THAT ACT AS DEMULCENTS. The following beverages are valuable in soothing the throat and the digestive tract.

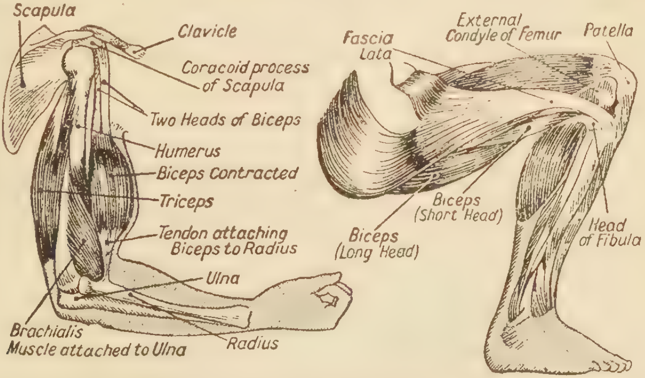
Black Currant Drink. Put into a saucepan 1 tablespoonful of black currant jam, or 1 dessertspoonful of black currant jelly, the juice of half a lemon, 1 tablespoonful of sugar and 1 breakfastcupful of water. Bring to the boil, simmer for 10 minutes, strain and serve hot. This serves as a simple remedy for sore throat and cough proceeding from irritation.

Linseed Tea. Into a jug put a tablespoonful of whole linseed, a tablespoonful of sugar, the juice of half a lemon and a little grated lemon rind. Over it pour a pint of boiling water. Cover, and set aside till quite cold. Strain into a glass jug and it is ready for use.

Gum Arabic Water. Put into a jar 1 ounce of gum arabic, 1 pint of water, 2 ounces of sugar candy and the juice of half a lemon. Place in a saucepan of boiling water and stir occasionally till dissolved. Serve very hot.

Irish or Carageen Moss Drink. This "moss" is in reality a seaweed, found on the northern shores of Ireland. It contains mucilage, and a small proportion of iodine and sulphur. It is procured from chemists in packets in a dry state. Take an ounce of the moss and soak it overnight in 2 quarts of cold water. Bring to the boil, then simmer gently for several hours and the liquid is reduced to about a quart. Strain and sweeten to taste, adding lemon juice or any other suitable flavouring. Carageen moss is commonly supposed to have some nutritious value, but as a fact this is very small. *See* Barley Water ; Citric Acid ; Effervescence ; Invalid Cookery ; Lemon.

BICEPS. The name biceps, which literally means two-headed, is applied to the two muscles in the human body, which have two distinct origins or upper attachments. One is the large muscle on the front of the upper arm. It has a long head and a short head, attached to the shoulder blade at two different points. These two heads unite, and as it passes downwards


Scapula
Clavicle
Coracoid process of Scapula
Two Heads of Biceps
Humerus
Biceps Contracted
Triceps
Tendon attaching Biceps to Radius
Ulna
Brachialis Muscle attached to Ulna
Radius
Fascia Lata
External Condyle of Femur
Patella
Biceps (Short Head)
Biceps (Long Head)
Head of Fibula

BICEPS. Muscles of arm and thigh that serve to bend the limbs the muscle swells out into the large mass of flesh so familiar on the arms of muscular people. From this there issues a tendon which is attached to the radius, the outer bone of the forearm. When the muscle contracts it therefore bends the forearm upon the upper arm. It is thus the typical weight-lifting muscle and a notably important one in rowing. Its antagonist is a large muscle lying on the back of the upper arm, which arises by three heads and is called the triceps. The other biceps muscle is at the back of the thigh. *See* Arm; Leg; Muscle.

BIER'S METHOD. Inflammation is a device of Nature to combat bacterial invasion and to promote healing; these things are accomplished by flooding the diseased or injured tissue with blood, thereby adding to the nutriment available for repair and increasing the number of white blood cells and antibodies which deal with bacteria.

Bier's method of treating various affections is an attempt to imitate the natural mechanism by producing passive congestion. It has been utilised for un-united fractures, chronic joint diseases of all sorts, including tuberculosis, boils, and so on. The method of treating a joint, for example, is as follows:

A bandage must be applied to the limb below the joint, otherwise it will swell unduly; above the joint there is applied an elastic webbing or a pure rubber bandage outside a layer of lint, and this must be applied tightly enough to produce a bluish tinge of the skin and firmly to press all the superficial veins. Only three turns of the bandage, at most, are necessary. It should be worn for, say, sixteen hours a day, and in the interval the skin and the compressed muscles may be massaged and otherwise attended to, whilst a light bandage applied directly over the joint is of value in removing the unnecessary superficial swelling occasioned by the treatment.

Glass vessels, known as Bier's cups, are used for creating hyperaemia in smaller parts, such as boils or whitlows, by a process of suction. *See* Elastic Bandage; Hyperaemia; Inflammation.

BILE. Bile is a secretion produced by the largest gland in the body, namely, the liver. It is a viscid fluid with a very bitter taste, and is generally greenish yellow. It is also partly an excretion in respect of certain poisonous substances which it extracts from the blood. Sometimes when the bile flows sluggishly these are reabsorbed into the blood, and give rise to depression and the other symptoms connoted by the term biliousness.

The liver produces from 17 ounces to more than twice this amount of bile every day. The bile flows more or less constantly down the common bile duct into the duodenum, or first portion of the bowel; the pancreatic juice also enters the bowel through the common bile duct, and when it is flowing after a meal the two juices reach the food together. Bile is of value in digestion in that it aids the pancreatic juice to reduce fats into small particles and convert them into drops, a necessary preliminary to their absorption from the bowel. It also stimulates the muscle fibres in the intestinal walls and so assists in moving the contents along. In a slight degree it is antiseptic.

It has been pointed out that biliousness results from a sluggish flow of bile and the reabsorption of some of its poisonous contents. This may be remedied in various ways. Active bodily exercise, for instance, makes the flow more active, and abstinence from rich food diminishes its content of deleterious substances. Alkalies in large doses, for example, bicarbonate of soda, make it more liquid, so that it flows more readily.

Some substances directly stimulate the liver cells to form bile. Amongst them are sodium salicylate and aloes. Others, again, act indirectly by sweeping the bile away from the duodenum, carrying it swiftly through the bowel and preventing reabsorption. These include calomel and podophyllin. Olive oil in large doses appears sometimes to promote the expulsion of gall-stones from the gall bladder. *See* Biliousness ; Gall Bladder ; Liver.

BILE DUCT. The channels through which the bile flows from the liver to the bowel are known as bile ducts. They are subject to several important diseases. One is a simple inflammation which naturally interferes with the flow of the bile through them. It is usually due to the upward spread of inflammation from the bowel and results in a varying degree of jaundice. A second disease is blocking by a stone or gall-stone, and a third, very much less common than the others, is cancer. It is probable that in very many cases there is a relation between these three diseases ; it is the inflammation of the bile ducts that gives rise to the change in the bile which results in the formation of gall-stones, and it is the chronic irritation set up by the gall-stones that very often seems to be the predisposing cause of the cancer.

BILHARZIASIS. In Africa, especially in Egypt, in Japan and elsewhere, human beings may become infested with small fluke-worms which produce characteristic symptoms. The disease gets the general name of bilharziasis as it results from the presence of bilharzia haematobia, or other varieties of the bilharzia worm.

The most usual symptoms are some irritability of the bladder, causing frequency of micturition and the presence of blood and a little pus in the urine. If the urine is examined microscopically the eggs of the worm are seen, each with a sharp spine at one end. In other cases there is irritation in the bowel, and occasional diarrhoea with blood and mucus in the stools. The disease is treated by injection of tartar emetic or of emetine into the veins or muscles. This kills the adult parasites, thereby preventing egg-laying.

BILIARY COLIC. The pain occasioned by the spasmodic contractions of the bile ducts in their attempts to rid themselves of gall-stones is called biliary colic. *See* Gall-stone.

BILIOUSNESS. According to popular usage, the term biliousness is applied to a condition characterised by nausea and possibly sickness, a furred tongue, headache, a dull, heavy feeling in the pit of the stomach, and constipation. The headache is often referred to as bilious headache, and if bouts of this kind occur, accompanied by vomiting, they are called attacks of bile. These conditions have very little to do with the amount of bile produced. It is sometimes thought when bile appears amongst vomited matter that this is because an excess of bile exists. As a matter of fact, however, when vomiting, from whatever cause, has gone on for a short time, bile tends to be drawn into the stomach, so that its presence in the vomit means nothing.

The liver may be implicated in biliousness to this extent, however, that it is not adequately performing its functions of clearing the blood of deleterious products of digestion. It is to be noted that all the blood from the stomach and bowels must pass through the liver before it again flows in the general circulation. The default of the liver may be because an overwhelming amount of harmful substances are being produced owing to a disordered digestion ; or to constipation or a sluggish flow of bile allowing such substances to be reabsorbed into the blood. Remedies are given under the heading Bile.

Vomiting from a variety of causes is sometimes called a bilious attack. Among possible causes are acute gastritis, following too much or too rich food ; migraine or sick headache ; headache due to eye-strain, either as part of a migrainous attack or separately ; acute glaucoma, due to increase of tension in the eye ; tumours of the brain, etc. In children the cause of an attack may be acute indigestion, but recurring bouts have in some cases been traced to appendicitis.

The treatment of all these conditions will depend on the cause, but when the digestion has clearly been upset by too much or a wrong kind of food an emetic may do much good, and vomiting should be encouraged by giving long draughts of tepid water to which may be added a pinch of baking soda. This will wash away the unwholesome stomach contents, but it is desirable also to clear the bowel, which may be done by giving a dose of castor oil or 2 or 3 grains of calomel at bed-time, followed first thing in the morning by 2 drachms of Epsom salts in a half-glass of water or by an ounce of black draught. The diet should be very light for a few days afterwards. When vomiting is persistent and distressing, a mustard plaster may be placed over the patient's stomach, and he may be given chips of ice to suck, though in some cases sips of very hot water are more successful. *See* Acidosis ; Gastritis ; Indigestion ; Liver ; Vomiting.

BIRTH MARK. Certain appearances in the skin, which are more or less visible at birth and popularly known as birth marks, are grouped under the term naevus. This means congenital, and so would include pigmented moles which are present at birth, but in using the term what is almost always in mind is the vascular naevus. This essentially consists of blood vessels of some kind ; veins, as a rule, or dilated blood spaces. A naevus which mainly consists of capillaries is invariably congenital.

A birth mark grows most rapidly when it is young ; after the first few months it usually grows only at the same rate as the child. In the latter case it is very apt to grow smaller as the child grows bigger, and a very large number of birth marks, indeed, undergo a natural cure. The most superficial kind of birth mark, however, often called the port-wine stain, almost invariably persists throughout life.

The object of treatment, when it is undertaken, is either simply to remove a disfigurement, or to eradicate a birth mark which is being irritated by clothing, etc. Methods include complete removal of the birth mark by the surgeon, or treatment by electrolysis, by liquid air or carbonic acid snow, by radium or by X-rays. Self-treatment of birth marks, including moles, by caustics is a dangerous proceeding. *See* Carbonic Acid ; Electrolysis ; Mole.

BIRTH PARALYSIS. Sometimes babies are born with paralysis of one or more limbs, the cause of which, in the majority of cases, is some injury sustained in birth. Paralysis sometimes follows a precipitate birth, but much more usually one that is attended with difficulty and is delayed.

The paralysis may be present at birth or appear after a few days. The affected muscles are not only weak, but they are affected by stiffness, which, when the child begins to walk, causes what is known as " cross-legged progression." Besides this there may be tremor, speech difficulty, epilepsy and mental impairment.

Surgical measures are required early where there has been damage to nerves, and even in the brain cases operation has done good when performed early. Apart from this the child requires great care and abundance of patience during its training. *See* Childbirth ; Paralysis.

BISMUTH. In the form of a large number of salts and other preparations, the heavy metal, bismuth, has many uses in medicine. It acts as an antiseptic, an astringent and a sedative ; and to produce these effects it may be employed either internally or externally. In catarrh or ulceration of the lining membrane of the alimentary tract one of the following preparations may be used : bismuth subnitrate, bismuth carbonate or bismuth salicylate, the dose of each being 5 to 20 grains every 3 or 4 hours; the solution of bismuth and ammonia citrate, $\frac{1}{2}$ to 1 drachm, which is not so good as the solid preparations; or the compound bismuth lozenges.

By means of one of the foregoing preparations nausea, gastric pain, vomiting or diarrhoea may often be relieved. If there is much acidity, bismuth carbonate should be used, or, if the stools are offensive, bismuth salicylate. For dyspepsia a good combination is:

Bismuth carbonate	10 grains
Sodium bicarbonate	20 grains
Magnesium carbonate	10 grains

This is taken in a little milk about 20 minutes before meals, though it will relieve gastric discomfort whenever this occurs.

Any of these salts in fine powder may be used as a snuff for the relief of nasal catarrh. For the sore nipples of nursing mothers a paste consisting of equal parts of bismuth carbonate and castor oil is safe and effective. One drachm of bismuth carbonate, salicylate or oxide, with one ounce of starch powder, is often used for dusting burns or other inflamed skin surfaces; or instead of the starch the bismuth may be made up with an ounce of vaseline. Bismuth, iodoform and paraffin paste, commonly known as B.I.P.P., is largely used in the treatment of wounds, and especially those in which bone has been damaged. Bismuth carbonate or oxychloride may be used for a bismuth meal to produce opaque photographs in X-ray investigations of the oesophagus, stomach and bowel. Injections of bismuth are used fairly extensively in the treatment of syphilis.

Owing to certain chemical changes which take place in the bowel, salts of bismuth almost invariably undergo a change into the sulphide of bismuth, which is black. This naturally imparts its colour to the motions and may lead to great alarm if the patient does not understand the reason.

BITE. A wound made by the teeth of an animal may be infected from the start, or this may happen subsequently. Care should be taken, therefore, to clean the wound and to protect it from contamination by a dressing. Small wounds may be dabbed with tincture of iodine, but a larger one should simply be covered with an antiseptic, or at any rate a thoroughly clean dressing, till it can be attended to by a doctor.

Bites, by a dog particularly, may cause much concern lest the animal should be rabid and the bite possibly result in hydrophobia (q.v.). But this is a very rare occurrence. When a dog, suspected of being rabid, has bitten someone it should on no account be destroyed if it can be safely secured. If the animal is infected, unmistakable signs of rabies will develop within a few days; if they do not, there need be no further anxiety on the score of hydrophobia. If the dog has to be killed at once, its spinal cord, packed in glycerin, should accompany the patient to a Pasteur institute, the address of which in Great Britain can be obtained from any police station.

In Great Britain the only dangerous snake bite is that of the viper or adder. This may produce at once a burning pain in the part bitten, but sometimes the first warning is the onset of symptoms due to the general action of the venom—faintness, nausea, sickness, diarrhoea perhaps, and a cold, clammy sweat over the body. The patient may actually become unconscious, but death is not likely to occur except, perhaps, in the case of a very young or an old or debilitated person.

In the case of a bite by a possibly rabid animal or a viper, if the bite is on a limb a ligature or tourniquet should be applied above the bite. This is made by folding a handkerchief as a narrow bandage, tying this loosely round the limb, inserting a stick through the loop, and twisting till the bandage is quite tight. The stick may be fixed by tying another handkerchief round the limb, binding down one end of the stick.

When the ligature is applied, or immediately in the case of bites elsewhere than on a limb, the wound should be sucked. There is no danger in doing this if the lips and mouth are free from cracks or abrasions. Afterwards the mouth should be washed out with water or, preferably, a little spirits. The wound is then covered up till a doctor can attend to it. The ligature should be taken off when the wound has been thoroughly cleansed, and in any case should not be left on for longer than half an hour.

The patient should lie down and should be kept as warm as possible; if out in the open, by overcoats and by chafing the limbs. A little spirits may be given to combat faintness, and he should be reassured as to the consequences of the bite. This last is very important. If the patient is indoors antiseptic lotions such as a saturated solution of boracic acid, carbolic acid lotion, permanganate of potash solution, etc., should be used to wash the wound, and the general condition may be improved by blankets, hot-water bottles, and by stimulants, such as weak spirits, sal volatile, tea or coffee.

Bites and stings of insects may produce itching, pain and swelling, and there is always the further danger of septic poisoning or of infection by many serious diseases, though the latter is more particularly to be feared in the tropics or during epidemics of typhus, relapsing or some other fevers. The best treatment for the bites is the application of ammonia, or, failing this, of solutions of permanganate of potash, bicarbonate of soda or common salt. Pain may be relieved by rubbing with a menthol cone or by an evaporating lotion.

Insect bites may be prevented by smearing the skin with ointments or lotions containing carbolic acid, kerosene, cinnamon oil, clove oil, etc., or with a bitter infusion, such as infusion of quassia. *See* Antiseptic: Bee Sting; Flies; Formic Acid; Hydrophobia; Mosquito; Tourniquet, etc.

BITTERS. The word bitters in popular language indicates alcoholic beverages which contain bitter or aromatic substances added in order to stimulate the appetite and the digestion. In medicine, bitters means the group of drugs of vegetable origin which contain bitter-tasting substances having a characteristic action upon the stomach. Of these there is a large number, including quassia, gentian, cascarilla, calumba, dandelion, orange-peel and chiretta.

Calumba and quassia are examples of pure bitters; other bitters, like cascarilla and orange-peel, contain also a volatile oil and are known as aromatic bitters. Strychnine and quinine, which are not usually classed with the drugs mentioned, possess the bitter taste and exercise all the actions which these bitters possess, whilst in addition they have distinctive properties of their own. The ordinary bitters have no remote action on the nervous system, for instance, but this is possessed by both strychnine and quinine.

Bitters stimulate the nerves of taste and, by doing so, the appetite. This stimulation increases the amount of the secretion of the salivary glands and also markedly increases, through a reflex nervous action, the amount of digestive juice that is secreted by the wall of the stomach. When the bitter substance reaches the stomach itself a similar action occurs; not only is the sense of hunger increased and the flow of the digestive juices made more rapid, but the movements of the stomach are also hastened. This stimulation of the muscular wall of the stomach also extends to the muscular wall of the bowel. This greatly aids the digestion of the food, and also tends to relieve pain of a colicky nature that is due to the irregular action of the muscular wall of the bowel, but it must be noticed that strychnine is more effective than any of the ordinary vegetable bitters in stimulating the muscular movements of the alimentary canal.

Generally speaking, the proper time to take a bitter is just before food. The following is an example:

Dilute hydrochloric acid	1½ drachms
Tincture of orange	3 drachms
Syrup of lemon	4 drachms
Infusion of calumba	to 6 ounces

The dose is a tablespoonful in a wineglass of water.

The desirable action of bitters, however, may very readily be exaggerated into an undesirable irritation; and this will happen either if the dose is excessively large, or repeated for too long a period. A mild chronic inflammation of the stomach is set up.

Bitters must never be employed in cases of ulceration of the stomach or any form of acute inflammation. The cases of dyspepsia in which bitters are of use are those due rather to general bodily weakness than any local malady of the stomach, and thus bitters are typically useful drugs in convalescence and in the general weakness which is associated with the various forms of tuberculosis. They are frequently of value also in treating cases of anaemia. *See* Appetite ; Digestion.

BLACK DRAUGHT. The compound mixture of senna is popularly known as black draught. It is used as a purgative, and owes its effects chiefly to its content of magnesium sulphate and senna. It is taken in a dose of 1 or 2 ounces the first thing in the morning, and is usually preceded by 4 grains of blue pill or 2 or 3 grains of calomel at bedtime.

BLACK EYE. *See* Bruise.

BLACKHEAD. The dark plugs in the sebaceous glands of the skin are popularly known as blackheads. Their presence is often associated with acne vulgaris (q.v.).

BLACKWATER FEVER. The disease commonly known as blackwater fever is also called bilious remittent fever, haemoglobinuria, and by other names. It occurs in tropical and subtropical countries, and is not seen in England except perhaps as a relapse in people who have been invalided for a recent attack. The disease is now almost generally regarded as a complication of malaria.

BLADDER. The term bladder is applied to two important organs of the body, the gall bladder (q.v.) and the urinary bladder, but it is the latter that is usually meant when the word is used without an adjective.

The secretion of the kidneys reaches the urinary bladder by passing through two long tubes called the ureters, and it leaves the organ through another tube called the urethra. Like nearly all the hollow organs of the body, it consists of four coats : a lining of mucous membrane, a loose fibrous submucous layer, a middle coat of muscular tissue, and a smoother, outer peritoneal coat which enables it to move without friction against the organs which surround it. Urine is expelled by the contraction of the muscular coat.

Diseases of the Bladder. Atony of the bladder, or a loss of power in the muscular coat, may be due to overstretching of the bladder, to inflammatory changes, to old age, or to debilitating diseases. Over-stretching is a not uncommon result from failure to obey the call to empty the bladder, or it may result from some obstruction to the flow of urine.

Obstruction, apart from overstretching, may cause retention of urine. It may be due to an enlarged prostate, an impacted stone, inflammatory or spasmodic closure of the urethra, displacements of the womb, and other causes. Retention of urine is not uncommon after childbirth or operations for piles or other disorders about the perineum. It may also occur in nervous and other diseases. The treatment consists in drawing off the urine with a catheter. While awaiting the doctor the condition may sometimes be relieved by putting hot fomentations over the bladder. Inability to hold the water may be due to nervous, inflammatory or other diseases. In certain cases where there is an overflow the condition may be due simply to the bladder being overfilled.

Inflammation of the bladder is called cystitis and may be acute or chronic. It is due to germ infection. Acute cystitis may follow a chill or may develop during influenza, typhoid or other fever. Sometimes infection comes downwards from the kidney, or it may come from the bowel or other organ in the neighbourhood of the bladder. There is a frequent and pressing need to pass water, which is thick and turbid and may come away in small quantities. There will be a certain amount of fever, accompanied by pain over the bladder and possibly pain in the loins also.

Treatment consists in confinement to bed with hot-water bottles at the feet. Hot fomentations may be applied over the bladder, or the patient may be given a hot hip bath once or oftener each day, great care being exercised to avoid exposure and chill. He should be given liquids freely, such as plain water, milk, barley water, gruel, etc. Alcoholic drinks of all kinds must be barred, also spiced foods and condiments till the doctor allows them. Medicinal remedies include bicarbonate of soda or of potash, hyoscyamus, belladonna, morphia or other sedatives, and hexamine or some antiseptic. The bowels should be moved once a day.

Chronic cystitis may follow an acute attack, but it may also result from the presence of a stone or of a tumour in the bladder or from some other cause. In elderly men it is not uncommonly caused by the decomposition of urine which is retained in the bladder in consequence of an enlarged prostate. The symptoms are somewhat similar to what has been described, but the pain is generally less severe than in the acute form. The general health is likely to be seriously depressed by absorption of poisonous materials from the bladder. Treatment consists in cleaning of the bladder by giving antiseptics by the mouth and by washing out the organ with antiseptic lotions. An enlarged prostate, or other causes, must then be dealt with so far as is practicable.

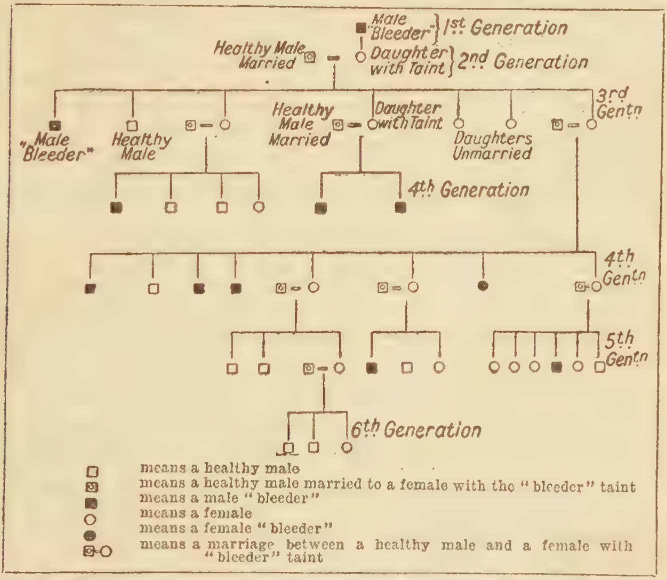
The bladder may be ruptured by violence, such as a kick or crushing of the pelvis, but this may also result from too long delay in passing water. An immediate operation is necessary. A vesicular calculus or stone in the bladder may be quite minute or as large as a duck's egg ; when small, a very large number may be present. Stones usually consist of uric acid, of phosphates or of oxalate of lime. The symptoms resemble those of chronic cystitis. Bed-wetting in children may be due to stone. Surgical treatment is necessary, either crushing the stone and washing it out of the bladder or removal by a cutting operation, though in women it may be possible to effect removal by dilating the urethra.

Of tumours occurring in the bladder the commonest innocent form is a papilloma or villous tumour. Workers in aniline factories seem to be particularly liable to this affection. It causes the occasional presence of blood in the urine and should be removed by operation. *See* Bacilluria; Bed-wetting; Bilharziasis; Catheter; Kidney; Micturition; Prostate; Strangury; Urine.

BLAUD'S PILL. *See* Iron.

BLEACHING POWDER. *See* Chloride of Lime.

BLEEDER. A person who suffers from a very peculiar and remarkable disease technically known as haemophilia is commonly referred to as a bleeder. The bleeder, who is almost invariably male, inherits his disease, and the symptoms of it may appear in the very earliest moments of life. He is apt to bleed in various parts of his body without any apparent cause, and causes which will produce very slight bleeding in most people, such as a trivial pinprick or the extraction of a tooth, produce the most severe bleeding in such a patient. He is also very apt to undergo large haemorrhages or bleedings into his joints.


Male "Bleeder"
1st Generation
Healthy Male Married
Daughter with Taint
2nd Generation
3rd Genᵗⁿ
"Male Bleeder"
Healthy Male
Healthy Male Married
Daughter with Taint
Daughters Unmarried
4th Generation
4th Genᵗⁿ
5th Genᵗⁿ
6th Generation
□ means a healthy male
⊡ means a healthy male married to a female with the "bleeder" taint
■ means a male "bleeder"
○ means a female
● means a female "bleeder"
⊡-○ means a marriage between a healthy male and a female with "bleeder" taint

BLEEDER. Genealogical tree showing how the taint may be transmitted

The inheritance of this disease is very remarkable; whilst females hardly ever suffer, they constantly transmit the disease from their fathers to their sons, whilst their daughters escape, but may in their turn transmit the disease to their sons. The blood is peculiarly constituted, so that the ordinary clotting which usually arrests bleeding is delayed owing to the slowness with which fibrin ferment is produced.

When the bleeding occurs it must, of course, be treated on the ordinary lines, that is, pressure, very hot or very cold water, the application of perchloride of iron, alum or another styptic (q.v.). Transfusion of blood may be called for in desperate cases.

A grave question arises as to public duty in cases of haemophilia. It must surely be maintained that in cases of a disease so definite and unmistakable, and one that interferes so seriously with happiness and efficiency of the individual, the question undoubtedly arises whether the bleeder or the daughter of one so afflicted is justified in having children. *See* Blood; Coagulation; Transfusion.

BLEEDING. Whenever a blood vessel is injured so that an actual opening is made in its wall there must be a certain amount of bleeding, or, as it is technically described, haemorrhage. The bleeding may be external, that is to say, the blood appears on the surface of the body or it may be internal.

In the latter case the patient may die without any blood being visible at all, unless it is overflowing into some organ such as the stomach or lung, whence it may be ejected by vomiting, coughing or otherwise.

In general three kinds of bleeding are distinguished, varying in character according to the kind of blood vessel injured. Bleeding from an artery—which is more likely to be fatal than any other kind of bleeding—is distinguished in that it comes in jets which correspond to the pulse felt at the wrist, and by the fact that the blood has the character of arterial blood, that is, it is brighter and redder than the blood found in capillaries or veins. Bleeding from a vein is distinguished by the dark colour of the blood as compared with arterial blood, and also by the fact that it flows continuously. Bleeding from capillaries is easily distinguished, assuming that the site of the bleeding can be seen, by the fact that it is a general ooze from the surface. When this occurs from the skin it is of small importance, but from mucous membranes, such as the lining of the throat and nose, it may be more difficult to control.

The loss of blood, from whatever source, results in certain symptoms, the severity of which depends, of course, upon the amount of blood lost. Typically, the patient displays a cold, moist skin which, like the lips and finger nails, is abnormally pale; the pulse, when felt at the wrist, is found to be rapid and small, and when the bleeding has been excessive it is often impossible to feel any pulsation at the wrist at all. The patient breathes more rapidly and often complains of shortness of breath. A very marked and characteristic symptom is extreme restlessness. When the bleeding has reached a certain point the patient becomes unconscious and may ultimately die. There is, however, at this point a certain compensatory action which often saves his life: the immediate cause of the bleeding is the pressure of the blood in the blood vessels, and this may be so reduced by the diminution of the bulk of the blood, and the feebleness of the heart consequent upon this, that bleeding may cease. In the great majority of cases bleeding is arrested by nature long before compensatory action is necessary. The most important factor in the natural arrest of bleeding is the coagulation of the blood, which plugs the openings in the injured blood vessels.

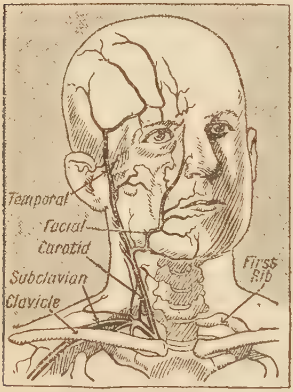
The treatment of bleeding naturally falls under two heads: attempts to check the bleeding, and attempts to obviate its consequences.

The first thing to do in the case of any haemorrhage from a visible point is firmly to put the finger upon it and to keep it there. In case of bleeding from a limb, this should be elevated, thereby securing the assistance of gravity. The pressure on the bleeding point begun by the finger may be continued by a firm pad composed of thoroughly clean linen, or, better still, boracic lint or antiseptic gauze, the dressing being first wrung out of any antiseptic lotion which is available. If pressure on the bleeding point is impracticable, for example, in the case of a large wound, it will be necessary to apply it to the main artery supplying the part, and in order to maintain this pressure an apparatus will have to be used to relieve the fingers. The means for applying this pressure is a tourniquet, which is described under its own heading.

Very cold water, or water as hot as can be borne, arrests haemorrhage, and vinegar, alum, tannic acid, spirits and other substances are helpful; but these measures are chiefly valuable for capillary bleeding, being useless in bleeding from a large artery. Of the various methods employed by the surgeon for the arrest of bleeding, the most important is the ligature, a thread made of silk or catgut which is firmly tied round the cut blood vessel.

General treatment of haemorrhage may be scarcely less important than local treatment. The patient's head must be kept very low, whilst the arms and legs must be raised in order that the heart, lungs and brain may secure as much blood as possible. This may be further secured by firmly bandaging all four limbs, beginning at the hands and feet and working upwards. The patient must be kept warm and at absolute rest; and the room in which he is placed must be freely ventilated. If it is absolutely certain that the bleeding has been securely stopped, stimulants may be given, such as spirits well diluted, sal volatile, tea or coffee.

But it has been shown that there is a more important measure than almost any of these. Death from haemorrhage occurs because there is an insufficient amount of fluid in the blood vessels—of fluid, not necessarily of blood—for when the amount of fluid falls below a certain point the heart ceases to contract. Fluid should therefore be freely supplied.



BLEEDING. Main arteries of neck and face in relation to the bones

The patient may be urged to drink large quantities of warm fluid, and a pint and a half, or even more, of warm water may be slowly injected into the bowel in the hope, usually justified, that it will be retained. The best fluid to employ is what is called normal saline solution, the composition of which closely corresponds in the percentage of salt (0.9) it contains to the normal fluids of the body. The desired proportion can easily be remembered, since it closely corresponds to a teaspoonful of salt to a pint of water. The fluid may also be injected under the skin, in which case it must, of course, be sterilised. Sometimes conditions arise where the transfusion of blood has to be undertaken.

It will be useful now to consider in summary form where pressure should be made on main arteries of supply, when bleeding cannot be controlled otherwise. The reader is referred to Plates 10 and 11.

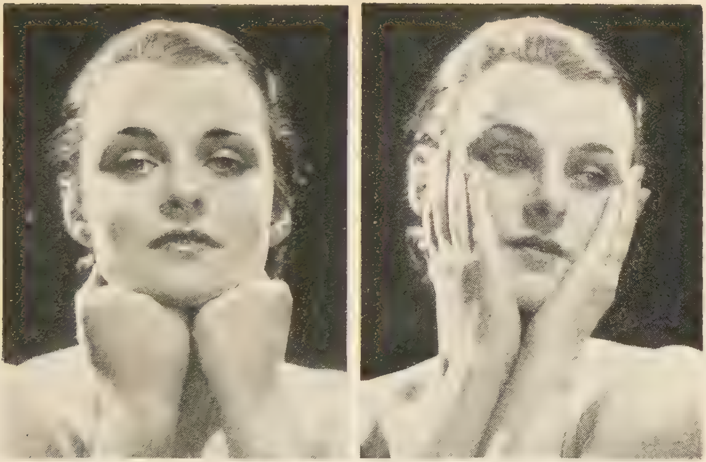
Front of Scalp. Press on the superficial temporal artery where it crosses the arch of the zygoma, a finger-breadth in front of the ear-hole. The arch is the rounded bony ridge felt when rubbing the skin up and down in this region.

Back of Scalp. Press on the occipital artery at a point two finger-breadths behind, and a little below, the centre of the posterior margin of the ear.

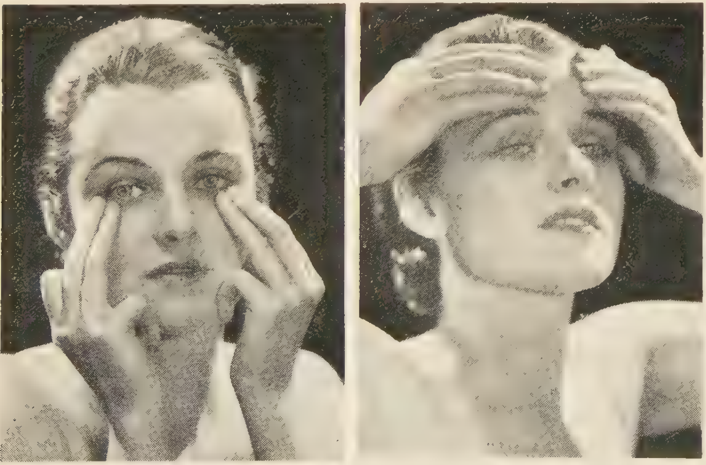
Face. Press on the facial artery at the point where it crosses the margin of the lower jaw an inch in front of the angle of the jaw.

Mouth or Side of Head. When bleeding is not controlled by any of the aforementioned procedures, press on the common carotid artery a little below and outside the Adam's apple. In doing this, the pressure should be exerted in a backward direction and rather inwards.

Armpit or Upper Arm. Press the subclavian artery down on the first rib in the hollow above and about the middle of the

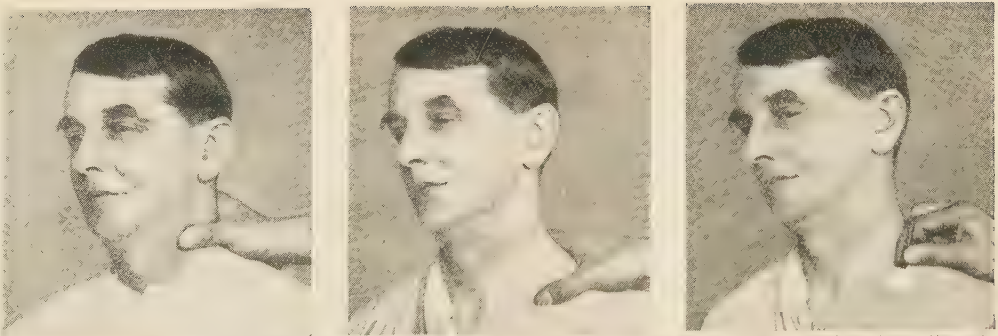


Left. Kneading movement with fists alternately pressing and lifting along the jawbone while the backs of the fingers press against the under-chin, throat and neck. Right. Cream is massaged into the skin with kneading, not dragging, movements, using the ball and palm of the hand : begin from the chin and work upwards and outwards in short steps

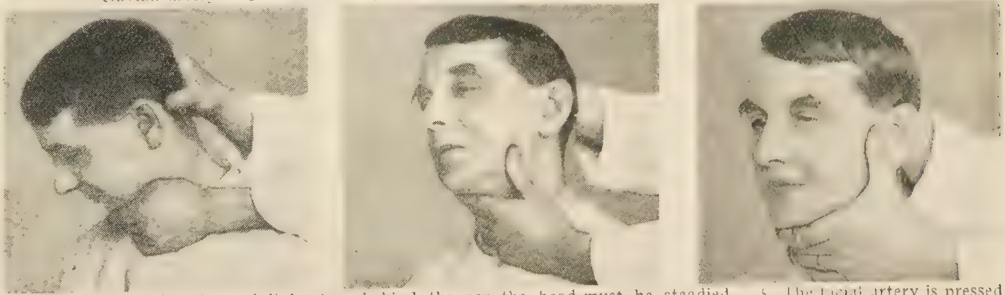


Left. Patting massage is best for lines under the eyes : little pressure and no pulling should be used. Begin at the inner corners and pat with the pads of the fingers gently round the eyes. Right. Wrinkles on the forehead are eased by stroking with some pressure, working from the centre to the temples and then from the top of the nose upwards to the hair

BEAUTY CULTURE : MASSAGE FOR MAINTAINING A YOUTHFUL CONTOUR

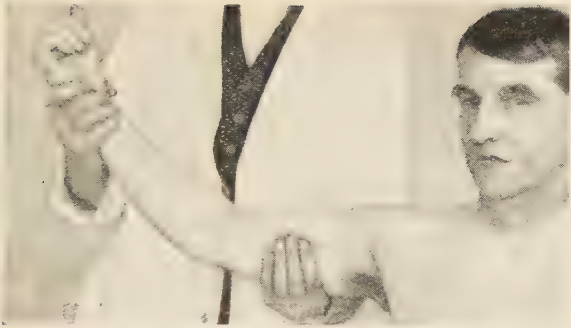


Bleeding. 1. Place for compressing the common carotid artery. 2 Pressure to arrest bleeding from the sub-clavian artery. 3. Pressure may be applied to the sub-clavian artery by means of a key handle.

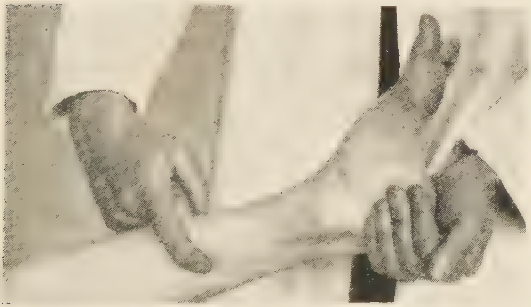


4. When compressing the occipital artery behind the ear the head must be steadied. 5. The facial artery is pressed against the lower border of the jaw. 6. Pressure applied to the superficial temporal artery

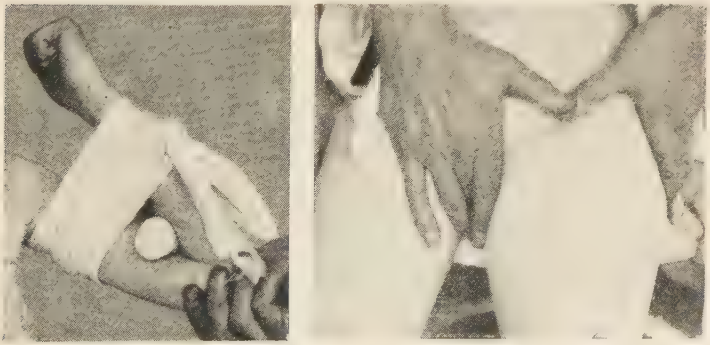
BLEEDING CHECKED BY COMPRESSING THE ARTERIES



Arresting bleeding by pressure on the brachial artery

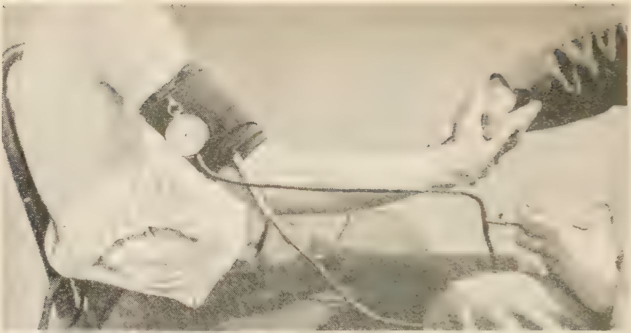


Pressure on the posterior tibial artery may arrest bleeding from the sole

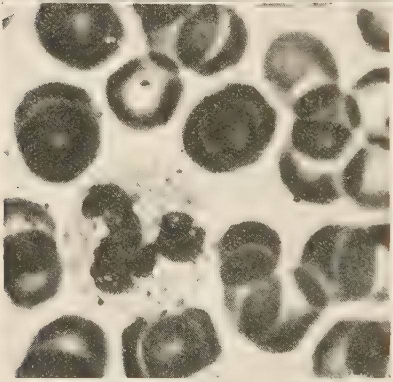


Left. Arresting bleeding from the arm by forced flexion of the elbow joint.
Right. Compressing the femoral artery

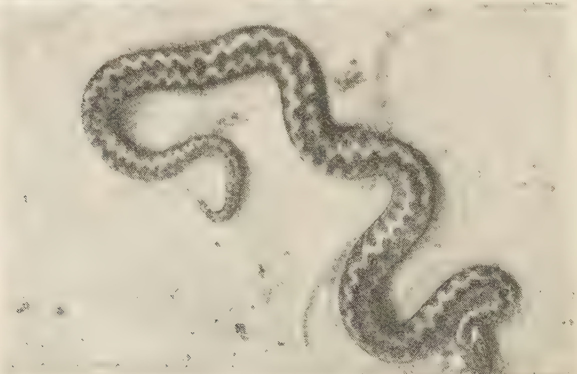
HOW TO ARREST BLEEDING IN THE ARM AND LEG



Blood Pressure. A sphygmomanometer is used to estimate blood pressure. Air is pumped into an elastic bag fixed round the patient's arm, and the amount of pressure so caused which is necessary to obliterate the circulation below it is measured on the dial



Blood. Microphotograph of red blood cells surrounding a white cell or leucocyte



Bite. Adder, the only British venomous snake. Note characteristic zig-zag line from head to tail

BLOOD, CELLS, BLOOD PRESSURE AND A VENOMOUS SNAKE

collar-bone. A thumb must be used and its pressure reinforced by the other thumb, or the padded handle of a key may be used.

Lower Part of Arm or Hand. Press the brachial artery out against the humerus in the upper half of the bone. The guide to the direction of the artery is the inner seam of the coat, and the pressure is best applied by gripping the arm from behind, the fingers being inside and exerting the pressure.

Thigh. Press the femoral artery as it passes over the pelvic bone at a point midway between the front end of the upper ridge of the haunch bone and the mid point of the pubis (the bony arch lying in front of the bladder). The pressure must be made with one thumb superimposed on the other. The tendency in this instance is to press too low down ; bone must be felt beneath the thumb, and the pulsation of the artery.

Sole of the Foot. Press on the posterior tibial artery in the hollow behind the inner prominence of the ankle, the pressure being made forwards and outwards against the foot.

Nose. In bleeding from the nose, or epistaxis, the patient should half recline and keep still, clothing about his neck being loosened, while cold cloths are applied over the forehead. If bleeding continues, the nostril from which it comes may be stuffed with a fine handkerchief or a long, narrow strip of lint or gauze.

Bleeding from the lungs, or haemoptysis, is recognized by the blood being coughed up. The blood has a bright colour, and is mixed with air. In bleeding from the stomach, haematemesis, the blood is vomited, is generally darker in colour than when from the lungs, and may be mixed with food. In either case the patient must be kept lying down and very quiet. Treatment by the doctor often includes a hypodermic injection of morphia. It is presumed, of course, that when bleeding of any consequence takes place a doctor will be summoned without delay. *See* Artery ; Blood ; Calcium ; Coagulation ; Hydrastis ; Ligature ; Styptic ; Tourniquet ; Transfusion.

BLEEDING or BLOOD-LETTING. The term bleeding has a different meaning, in indicating the operation of deliberately removing a certain amount of blood from the patient. This operation may also be called blood-letting or venesection, that is, the cutting of a vein. Bleeding as a remedy has fallen into disrepute, but in certain diseased conditions it is a very valuable means of treatment. *See* Congestion ; Cupping ; Leech.

BLEPHARITIS. Inflammation or, as it really is, eczema of the margins of the eyelids is known as blepharitis. It may exist as pustules, that is, blisters containing matter, at the roots of the eyelashes ; and sometimes a pustule will involve several eyelashes, which are thus matted together. When the pustules burst or the crusts which they form fall off, ulceration is left at their sites. Many of the eyelashes drop out. As the ulcers heal and form scars they may change the direction of the lashes, which perhaps project inward and rub on the eyeball; this is known as trichiasis. The whole eyelid margin may be dragged outwards (ectropion) or inwards (entropion), with much resulting disfigurement amongst other troubles. In more chronic forms of the malady the eyelid margins are red, thickened and covered with scales. The disease is contagious, but tends to occur chiefly in children, naturally weak, or whose health has been lowered by measles or a similar complaint.

As regards treatment, the eyes should be examined for refractive errors and suitable glasses provided if necessary. The general health should be improved by plenty of open-air exercise and a sufficiency of nourishing food, including cod-liver oil. An iron tonic such as Parrish's syrup may be given three times a day with advantage. If the scalp is scurfy it should be cleaned up with sulphur ointment. The eyelids should be washed frequently with a lotion of boracic acid, 10 grains to the ounce of water, and, for the removal of crusts or scales, solutions of sodium bicarbonate as often as may be necessary. Loose eyelashes should be pulled out. The pustular stage may be treated with a mixture of equal parts of yellow oxide of mercury ointment and vaseline. For the scaly stage this or boracic acid ointment may be used.

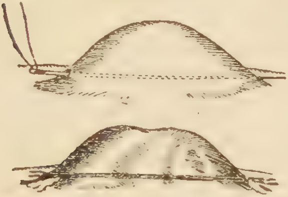
The ointments are best applied on a glass rod or with a camel-hair brush, both of which must be kept clean. Much patience and perseverance are often needed to effect a cure. Bearing in mind the contagiousness of the disorder, no other child should sleep with the patient, and no one should use his sponge or towel. *See* Eye; Stye.

BLINDNESS. The education of blind children cannot begin too soon; they must not be kept in bed, nor too sedulously protected from injury. Well-meaning parents must remember that all the other senses of blind children must be given a chance to develop and that they can only do so by experience. In the case of older people, who occasionally suffer from progressive disease which will probably end in blindness, it is a great advantage to begin education for the coming deprivation as soon as possible, since by this means much of the shock entailed by the final loss of sight may be averted. *See* Cataract; Conjunctivitis; Cyclitis; Eye; Glaucoma; Nyctalopia; Optic Nerve.

BLISTER. A variety of causes, some acting from within and some from without, may produce blisters, also known as blebs or vesicles, but in every case the blister is due to irritation of the deeper layer of the skin, which is stimulated to pour out a certain quantity of fluid; this fluid accumulates underneath the surface layer of skin and thus a blister is produced. In course of time the surface layer of skin becomes thin and bursts.

Blisters form in certain skin and general diseases, for example, eczema, herpes, pemphigus, impetigo, scabies, vaccinia, chicken-pox, etc., the size of the blister varying in different diseases. The contents may be clear and watery or turbid, but when a blister becomes filled with pus or matter, it is called a pustule. Blisters resulting from external irritants are exemplified in those resulting from burns or scalds, from pressure, or from the action of mustard, Spanish fly, or similar substances.

Blisters on the feet which result from much continuous walking may often be prevented if the boots chosen for the excursion are well-fitting. Care should be taken that the socks are not creased, and it will be an advantage if the insides of these are dry-rubbed with soap or dusted with boracic acid or some other smooth powder. The skin may be hardened by bathing the feet with weak solution of permanganate of potash or formaldehyde, a solution of alum or some methylated spirit.



BLISTER. Above, blister with needle run through; below, thread left in

When blisters of any size form either from pressure or burns, the contents should be let out, and the best way to do this is to thread a long needle with white thread and boil it for ten minutes. The needle is then passed through the top layers of the skin a short distance from the blister and carried on through this, a short length of thread being left at either side. This will enable the blister to drain, and will not leave the raw surface which results if the blister bursts. A needle can be completely sterilised for the purpose of pricking a small blister by the simple means of passing it two or three times through the flame of a spirit lamp.

Blisters on the face and neck often occur after exposure to strong sunlight. These may be prevented by using a parasol of a red or orange colour. When blisters form, the skin should be bathed with weak lead lotion and boracic acid ointment applied.

Cheiropompholyx is a skin disorder in which groups of blisters form on the hands and feet. It occurs usually in the spring and autumn and affects women mainly. It gives rise to much itching, which is increased by taking tea, coffee or alcohol. These should therefore be avoided. The health is usually poor and rest and tonics are required. Half a teaspoonful of Easton's syrup, or two teaspoonfuls of the simple syrup of hypophosphites, may be taken thrice daily in a little water, after food. The affected parts should be bathed in a warm solution of boracic acid several times daily, and in the intervals be kept covered with long strips of surgeon's lint or linen smeared with zinc ointment or cold cream.

Blistering is often done deliberately with the object of relieving deep-seated congestion or irritation by producing what is known as counter-irritation near the surface of the body; blood is thus drawn away from the deeper parts. This may be accomplished quite successfully by means of a hot iron, but it is most usually done by applying a plaster or blistering fluid, the active constituent of which is Spanish fly or cantharides. Lumbago, sciatica, pleurisy, pericarditis and synovitis are examples of ailments which may be so treated. Ordinarily a blistering plaster is left on for eight to ten hours.

BLISTER. Use of a flying blister

When the vesicle has formed it is pricked with a clean instrument, such as the sharp point of a pair of scissors which have been boiled for twenty minutes, and then the loose skin is snipped off all round, the resulting raw surface being dressed with boracic ointment. Care should be taken that the fluid does not run over adjoining skin, and particularly into the eyes or mouth, etc. To prevent this, and also when painting on a blistering fluid, the area may be ringed with vaseline. *See* Burn; Cantharides; Counter-irritation.

BLOOD. In the body the blood is contained within a completely closed network of tubes called the blood vessels: arteries, veins and capillaries. From these it never escapes, save by accident; that is to say, it never escapes in mass, but, on the other hand, various constituents of the blood are incessantly passing through the walls of the blood vessels to every organ and tissue of the body, and other substances pass through the walls of the blood vessels in the opposite direction.

The blood is in the first place a food, or vehicle for food, for every part of the body. The substances required by the various tissues for their health are very numerous, and each of them must be represented in the blood. Furthermore, from the blood are produced all the special fluids which the body forms by means of various organs. Some of these are excretions, getting rid of waste matter, for example, the urine and sweat; the others are secretions formed to fulfil a specific function, such as the digestive juices, milk, thyroid extract, suprarenal extract, etc. In the case of the two last mentioned and others, not only are they produced from materials brought by the blood, but they are poured by the glands producing them into the blood, in which they circulate.

The blood also carries oxygen from the lungs to the tissues, the oxygen being taken up by the haemoglobin or red colouring matter. Another function of the blood is to distribute heat. This is formed by a process of oxidation, principally in the muscles and in the larger glands, and the blood flowing through these structures is warmed.

Blood also removes the waste or even poisonous substances which have been formed by the process of living. It is therefore a drainage arrangement as well as a food supply. Carbonic acid gas, formed by combustion going on in the tissues, is carried from the tissues to the lungs, where it is liberated. In the blood the carbonic acid is chiefly carried as bicarbonate of soda and of potash, but part is attached to the red blood corpuscles. Amongst other waste substances is urea which is excreted by the kidneys.

The total amount of blood in the body is about one-twelfth of its weight. Of this about fourteen per cent consists of solid elements. The fluid part of the blood is called the blood plasma. It can easily be examined by itself when the solid elements have been removed from a specimen of blood.

It is an almost colourless fluid ; its most important constituents are a protein substance or albumin which has a very close resemblance to white of egg, a kind of sugar, a certain amount of fat, and another protein substance called fibrinogen which is of great importance in the arrest of bleeding. In addition, the fluid part of the blood contains the internal secretions already mentioned and at least a dozen poisonous substances which it is carrying to the organs concerned with their removal. The most important of the many salts of the blood (there are at least nine) are common salt, or chloride of sodium, and the phosphate of sodium, each of which is essential to life. There is another important and vital salt which is contained in the blood, and this is phosphate of lime.

The solid constituents of the blood are minute cells, of which there are two kinds, the white and the red. The white blood cells or blood corpuscles are technically known as leucocytes (q.v.). Several kinds can easily be distinguished, and most have the character of changing their shape and of being able to crawl slowly about along the walls of blood vessels, and through the walls into the tissues outside. They play an important part in the clotting of blood ; they also attack microbes that enter the blood, and those resulting from disease or injury to various parts of the body which the white cells can reach by emigration through the walls of the blood vessels. The average number of white cells in one cubic millimetre of blood—roughly corresponding to two pin-heads—is, 10,000.

The average number of red cells in the same space is about 5,000,000 ; thus the normal proportion, sometimes very much disturbed, of white cells to red cells is about 1 to 500. The red blood cells are in some ways much simpler to study than are the white cells. The healthy red cell is a circular, flat object rather more than one four-thousandth of an inch across. It has a simple network structure and is filled with a yellowish red material which gives its colour to the blood and is known as haemoglobin. The blood in the arteries is bright red because the haemoglobin is combined freely with oxygen; when this oxygen has been lost, as in venous blood, the colour is purple or black.

These cells are incapable of any independent movement except when they are very young; they have but a short life, probably only two or three weeks, and are mainly broken down in the liver. From them is derived the colouring matter of the bile. They are constantly being produced in the human being by the red marrow of the bones.

Unlike the white blood cells, the red cells appear to have only one function, the performance of which depends entirely upon their possession of haemoglobin. As stated above, this has the power of forming a very loose union with oxygen, and as the red blood cells pass through the lungs they take up from the air a quantity of oxygen, which is carried to the tissues and given up to them as they require it, while the carbonic acid is partly conveyed from the tissues by these corpuscles.

In addition to the blood corpuscles, minute bodies called blood platelets are found floating in the plasma. These would appear to have some action furthering the clotting of blood as they are absent in purpura and in some of the specific fevers when bleeding takes place into the skin and from mucous membranes.

The normal temperature of the blood is about 100° F. When the temperature of the body is ascertained by the means of a thermometer, however, it is not possible to bathe the instrument in the warm blood, and so the normal temperature for practical purposes is about 98.4° F. *See* Anaemia; Circulation of the Blood; Coagulation; Cyanosis; Leucocyte; Leukaemia: Plethora; Secretion; Transfusion.

BLOOD POISONING. When, as a result of a dirty wound or other infection, bacteria or their products, or both, are circulating in the blood and giving rise to fever and other symptoms, the condition is popularly called blood poisoning. *See* Pyaemia; Sapraemia; Septicaemia.

BLOOD PRESSURE. In order to maintain the circulation of blood through all parts of the body it is necessary that the pressure in the arteries should be kept at a sufficient level. The amount of blood in the vessels affects the pressure, but the main factors in producing it are the action of the heart and the resistance interposed by the smaller arteries; these contract or dilate according as the pressure requires to be raised or lowered. The blood pressure rises as people grow older. If it is too high, giddiness and other symptoms arise, and there is a danger of apoplexy. *See* Arterio-sclerosis; Circulation of the blood; Hyperpiesis.

BLOOD VESSEL. The blood vessels are divided into those which carry blood from the heart, the arteries; those which carry blood to the heart, the veins; and those which connect the arteries and the veins, the capillaries. The blood vessels are naturally subject to the influence of any poisons that may be present in the blood, and these cause the most common disease of blood vessels, an irregular thickening of their walls, together with a loss of elasticity which renders them liable to break. The technical name for this condition is arterio-sclerosis (q.v.). *See* Artery ; Blood ; Circulation of the Blood ; Vein.

BLUE DISEASE. Congenital cyanosis or lividity of the skin and mucous membranes is sometimes called blue disease. *See* Cyanosis ; Heart.

BLUE OINTMENT. Mercury ointment, also called, on account of its colour, blue ointment or blue butter, has been largely used for introducing mercury into the system in the treatment of syphilis.

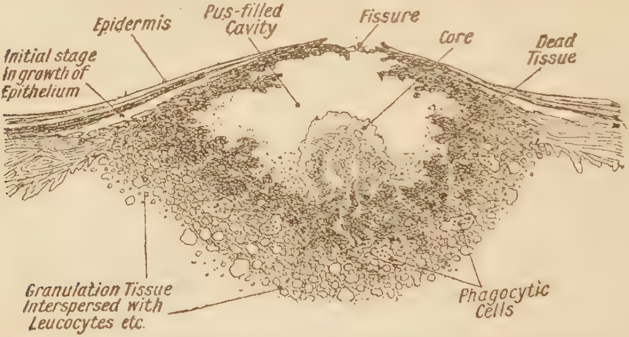
BLUE PILL. The pill of mercury, or blue pill, is an old-fashioned remedy for clearing away bile. It is taken in a dose of 4 to 8 grains, in the evening, followed next morning by a dose of black draught (q.v.) or of salts.

BLUE STONE. A sulphate of copper crystal, popularly called blue stone, is often used to reduce exuberant granulations, which are better known as proud flesh, and to stimulate the healing of sluggish ulcers. *See* Caustic ; Copper.

BLUSHING. A blush is due to a widening of the blood vessels of the skin induced by the nervous system in certain mental states. Blushing and flushing of the face are most common and troublesome at the period of puberty and also at the change of life in women. The victim of the habit may be painfully aware of its occurrence. Young people who are shy and self-conscious may diminish this tendency by cultivating a sympathetic interest in the doings of their fellows and by joining heartily in their games, whether in or out of doors. *See* Adolescence ; Change of Life.

BOIL. A boil is a local inflammation of the skin due to attacks by certain microbes. In general microbes will not cause a boil, unless the power of resistance of the skin has been weakened. The causes of such weakening may be general ; thus boils frequently occur in the course of chronic disease, for example, diabetes and Bright's disease and during convalescence from various fevers. The cause may also be local, the resistance of the skin being weakened by continued irritation or by friction. The commonest site of boils in healthy people is the nape of the neck, which, as a rule, has been irritated by a rough collar.

The smaller boils are usually allowed to follow their own course, though boils about the nose or in the ear should be at once shown to a doctor. Large boils anywhere may be exceedingly painful and require surgical treatment, but in every case it is very desirable to apply some antiseptic ointment—one, for instance, containing 60 grains of boracic acid in one ounce of vaseline—to the skin around the boil, otherwise this is almost certain to become infected, and so one crop of boils will succeed another. Another method is to apply a piece of adhesive plaster with a circular opening over the point of the boil.


Epidermis
Pus-filled Cavity
Fissure
Core
Dead Tissue
Initial stage in growth of Epithelium
Granulation Tissue Interspersed with Leucocytes etc.
Phagocytic Cells

BOIL. Sectional diagram of the core surrounded by pus and dead tissue

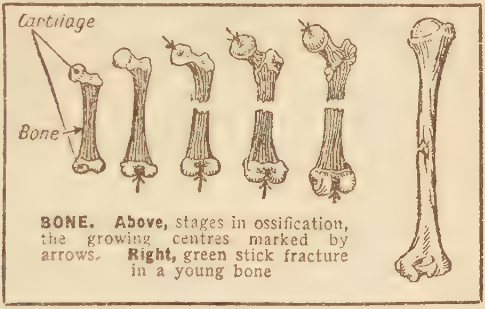
The occurrence of boils all over the body demands tonic treatment and change of air, and must not be regarded as merely a disease of the skin. *See* Carbuncle.

BONE. Bones owe their hardness to mineral salts, chiefly phosphate and carbonate of lime, and their elasticity to the fibrous tissue which they contain. In the early stages of their development they consist of cartilage or gristle or of membrane in which mineral matter is gradually laid down, a process known as ossification. In the bones of a young child there is twice as much animal as mineral matter, so that they do not usually break completely but partly break and partly bend, as with a green twig. As age advances the bones progressively increase their content of mineral matter, which becomes so high proportionately in old people that a very slight jar may suffice to break a bone.

In individual bones part of the structure will be found to consist of dense ivory-like bone while the remainder is spongy or cancellous, the spaces being filled with red marrow. Illustrations of types of bones and bone structure are given in Plate 13.

Every bone has a covering of membrane, known as the periosteum, which takes an important share in nourishing it. When bones move on one another the opposing surfaces are covered with cartilage. Bone is tunnelled by an immense number of minute channels (the Haversian canals) along which run its blood vessels. When inflammation occurs in bones it may affect the periosteum (periostitis), the bone (osteitis), the bone marrow (osteomyelitis), or all three. It may be due to injury, for example, a kick on the shin, or microbes may enter through an open wound or be brought by the blood, more particularly after an injury.

A young child suffering from a sore throat or having some other source of infection may receive a slight injury to a bone, for instance, the femur, in consequence of which a violent inflammation is set up in the bone and bone marrow. The child may die of blood poisoning, but if it recovers a large portion of the shaft of the bone dies. Death of bone like this, en masse, is called necrosis, and the dead piece of bone is a sequestrum. Death of minute portions, comparable with ulcers of soft tissues, is known as caries.



BONE. **Above,** stages in ossification, the growing centres marked by arrows. **Right,** green stick fracture in a young bone

The bones become softened in rickets (q.v.) and osteomalacia (q.v.). In consequence they are frequently deformed, as may happen also in osteitis deformans and other diseases. In connexion with bone a variety of tumours may form. These may be of the simple variety, bony, cartilaginous, etc., or they may be malignant and more especially types of sarcoma (q.v.). *See* Caries ; Cartilage ; Epiphysis ; Fracture ; Joint ; Myeloma ; Necrosis ; Osteitis ; Osteoarthritis ; Osteomalacia ; Osteomyelitis ; Periosteum ; Skeleton ; Tumour.

BORACIC ACID. Boracic, also known as boric powder, has feeble but useful antiseptic properties. The drug is of value because it is so safe, but when a powerful antiseptic action is required it must not be relied upon. It may be used as a lotion, a dusting powder, or an ointment. A saturated solution, made by dissolving in hot water as much of the acid as will dissolve, and allowing to cool, may be used to wash sores ; as an eye lotion, the saturated solution should be mixed with an equal part or more of hot water. The powder may be dusted on sores, or used in eczema and other conditions in the following prescription :

Boracic acid	1 drachm
Zinc oxide	1 drachm
Starch powder	1 ounce

To be dusted on.

An ointment may consist of 1 drachm of boracic acid with vaseline to make an ounce. The glycerin of boracic acid may be dropped into the ears to lessen discharge, or it may be diluted with water and used like the acid.

BORAX. Biborate of soda, commonly called borax, is the usual remedy for destroying the fungus of thrush. The powder may be rubbed on the affected surface, but for infants glycerin of borax should be used. This is better than honey of borax. It is applied to the mouth with a brush or the nurse's finger, and is equally useful in other forms of sore mouth. As a lotion for the eyes, 10 grains are dissolved in an ounce of water, and an ounce in a pint of water may be used as a gargle or as an injection for leucorrhoea or whites. This lotion will often relieve itching of the skin.

The glycerin of borax is an excellent application for sore nipples. The addition of borax softens water and makes it more wholesome for delicate skins; a strong solution lathers on the scalp, and is helpful in getting rid of dandruff. The internal administration of borax, along with bromides, has given good results in epilepsy.

BOTULISM. Cases of poisoning occurring from eating food which has been canned or bottled, usually when this has been done at home, have been traced to the presence of the bacillus botulinus in the food. The ill effects are due to substances manufactured by this microbe. The symptoms include vomiting and purging, abdominal pain, cramp in the limbs, paralysis or weakness of the legs, and perhaps difficulty in speaking. The attacks are often fatal; in some outbreaks all those affected have died. An antitoxin is now obtainable and should be administered early. The danger is avoided by thoroughly cooking the food before use; it is not enough merely to warm it.

BOWEL. *See* Intestine.

BOW LEG. The usual form of bow leg is more accurately bow knee; on the other hand, the thigh may be normal in alinement, and the curve occur entirely in the shin. In practically every case bow legs are due to deformity of the bones of the leg caused by former rickets. It is, so to speak, a mere accident whether bow legs or knock knees result in cases where the bones of the leg have been softened by rickets. The condition is due to the weight of the body pressing on the softened bones. When the tendency appears in a young child it may be countered by keeping him in bed and binding the legs to a well-padded splint placed between them. It is essential at the same time, that attention should be paid to the general health. Children who are allowed to walk about should wear metal splints or braces on the insides of the legs. Bow leg is less disabling than knock knee, but, if the patient desires, the twisted bones may be broken and the legs straightened. *See* Rickets.

BOW LEG. Comparison with normal leg

B.P. The initials B.P. appended to the name of a preparation signify that it is mentioned in the compilation known as the British Pharmacopoeia. This gives an account of the drugs in general use amongst British medical men, including tests of their purity, standards of strength in active principles, methods of preparation, doses and so on. Unless there is a direction to the contrary the drugs ordered on a doctor's prescription must conform to the specifications of the current edition of the British Pharmacopoeia. The initials B.P.C. stand for British Pharmaceutical Codex, which includes drugs and preparations additional to those mentioned in the British Pharmacopoeia.

BRADYCARDIA. This is the Greek equivalent for slowness of the heart. Exceptional slowness of the pulse is an uncommon symptom, and is of small importance as a rule. It is often noticed in jaundice. When the pulse is below 50 per minute the possibility of heart block has to be considered. *See* Heart; Pulse; Tachycardia.

THE BRAIN AND ITS FUNCTIONS

With Advice about Treating Concussion and other Injuries

The following article describes in the simplest possible language the nature of the human brain before passing to say something about the injuries to which it is subject See further Apoplexy: Embolism; Epilepsy; Insanity; Meningitis; Paralysis, etc.

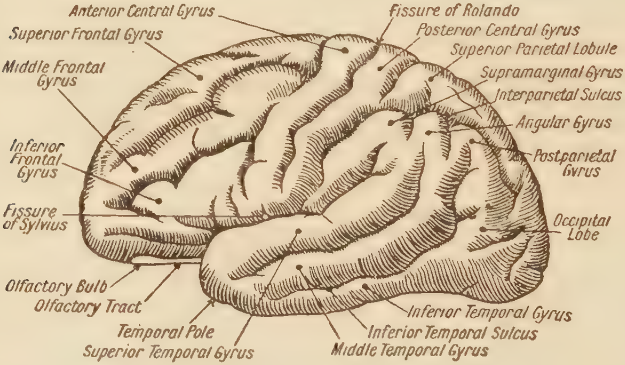
The large masses of nervous tissue forming the human brain have an average weight of forty-nine ounces in a male adult. The structure of the brain shows extraordinary complexity. The larger part consists of the cerebrum in the form of two hemispheres, right and left, which are connected together by a broad band of fibres running transversely, and known as the corpus callosum. Below this come, in succession, and on either side, masses of grey nervous matter, the optic thalamus and corpus striatum, and a stalk, the crus, literally a limb. Then there is the pons or bridge, and lastly the medulla oblongata or bulb which is continuous with the spinal cord (q.v.). Behind and below the cerebral hemispheres is the cerebellum, or little brain, which also consists of two hemispheres. These are connected with each other by a central part called the vermiform process and also through the pons.

Nervous matter is of two kinds, grey and white. The former consists of nerve cells and their processes, and the latter of medullated nerve fibres, that is to say, nerve fibres which have a protective white sheath. Both the fibres and the cells are supported by a kind of connective tissue called neuroglia.

The outer surface of the cerebrum and of the cerebellum is composed of layers of grey matter, and this is infolded, forming convolutions, affording thereby an increase in the area of the brain surface. The optic thalamus is composed of grey matter, and there are other masses in the base of the brain, in the crus, the pons and the medulla. It is in the cells of the grey matter that nerve energy originates. The nerve fibres of the white matter merely transmit such energy.

Within the brain there is a series of cavities, known as ventricles, which communicate with each other and with a canal which runs down the centre of the spinal cord. These are filled with a watery fluid, called the cerebro-spinal fluid. The brain is covered by three membranes, the pia mater, in close contact with the brain substance, the arachnoid and the dura mater. The last is in two layers, one lining the interior of the skull, and the other supporting the brain and sending folds into the deep fissures in the brain in order to accomplish this.

The space beneath the arachnoid is filled with cerebro-spinal fluid, which is in communication with the fluid in the ventricles of the brain through certain openings at the back of the medulla oblongata. This fact is of importance in connexion with the occurrence of hydrocephalus (q.v.). It will be appreciated also that, as a preventive against injury, the brain has the advantage of resting on a water cushion.

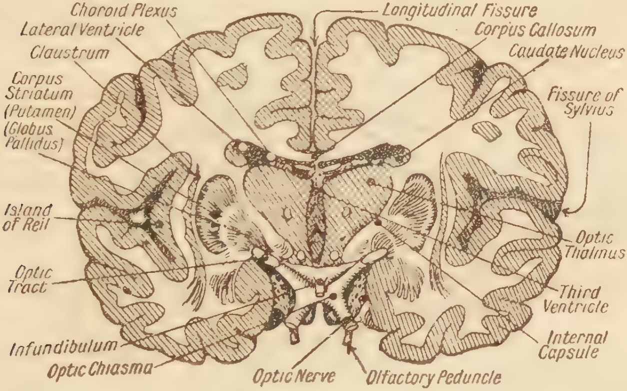

Anterior Central Gyrus
Fissure of Rolando
Superior Frontal Gyrus
Posterior Central Gyrus
Superior Parietal Lobule
Middle Frontal Gyrus
Supramarginal Gyrus
Interparietal Sulcus
Angular Gyrus
Inferior Frontal Gyrus
Postparietal Gyrus
Fissure of Sylvius
Occipital Lobe
Olfactory Bulb
Olfactory Tract
Inferior Temporal Gyrus
Temporal Pole
Inferior Temporal Sulcus
Superior Temporal Gyrus
Middle Temporal Gyrus

BRAIN. Left side of brain, showing how the fissures and sulci break up the grey matter on its surface into lobes and convolutions

The deeper fissures seen on the surface of a cerebral hemisphere mark its division into lobes. The fissure of Rolando, which, beginning a little behind the top of the head, runs obliquely downwards and forwards, marks the boundary between the frontal lobe in front and the parietal lobe behind. The occipital lobe lies behind the parietal, and below these is the temporal lobe. The mention of these lobes simplifies reference to the functions of the brain. The grey matter on its surface contains millions of nerve cells, which are grouped according to the work they do. In front of the fissure of Rolando is the area concerned with initiating voluntary movements, subdivided into parts serving the leg, arm and face in this order from above downwards. The left side of the brain serves the right side of the body, however, and vice versa.

Sensation is to some extent served by this area, but more by the parietal lobe. Tactile sensations and those of pain and temperature are, however, appreciated by the optic thalamus.

The centre for hearing is in the temporal lobe, and smell seems to be related to a part of the brain at the anterior extremity of this lobe. The centres for vision are in the occipital lobe. The speech centres appear to be in the lower frontal and parietal lobes on the left side for a right-handed person. The cerebellum is of importance in preserving equilibrium, and in co-ordinating the movements of muscles so as to permit of the performance of complicated actions.

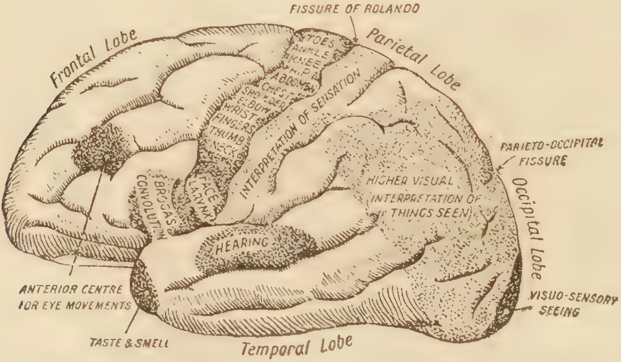

Choroid Plexus
Lateral Ventricle
Claustrum
Corpus Striatum (Putamen) (Globus Pallidus)
Island of Reil
Optic Tract
Infundibulum
Optic Chiasma
Optic Nerve
Olfactory Peduncle
Longitudinal Fissure
Corpus Callosum
Caudate Nucleus
Fissure of Sylvius
Optic Thalmus
Third Ventricle
Internal Capsule

BRAIN. Cross-section showing disposal of grey and white matter. It will be seen how the convolutions increase the surface area of the brain

From the brain come twelve pairs of nerves, whose names and actions are as follows : (1) olfactory, subserving smell ; (2) optic, nerve of vision ; (3) oculimotor, supplying most of the muscles which move the eyeball and the muscle which contracts the pupil ; (4) nerve supplying the muscle which turns the eyeball downwards and outwards ; (5) trigeminal, nerve supplying sensation to the face, etc., and to the muscles of mastication ; (6) nerve supplying the muscle which turns the eyeball outwards ; (7) facial, nerve supplying the muscles of the face ; (8) auditory, subserving hearing ; (9) glosso-pharyngeal, a nerve of taste, also supplying sensation to the inside of the throat and activating some muscles there ; (10) vagus, or wandering nerve, supplying the heart, lungs, stomach and other viscera, etc; (11) spinal accessory, supplying muscles in the neck; (12) hypoglossal, supplying the muscles moving the tongue.

The blood supply of the brain is derived from the internal carotid and the vertebral arteries. The venous blood and cerebro-spinal fluid drain into the large venous channels, known as sinuses, which, in turn, pour their contents mainly into the internal jugular vein.

INJURIES AND DISEASES OF THE BRAIN. An injury to the head may cause stunning or concussion; slight bleeding into the brain or on its surface, the pressure of a spicule of broken bone, meningitis or a commencing abscess following infection through a wound, may give rise to signs of serious irritation of the brain; while considerable bleeding, a piece of depressed bone or a developed abscess, will result in signs of compression of the brain.

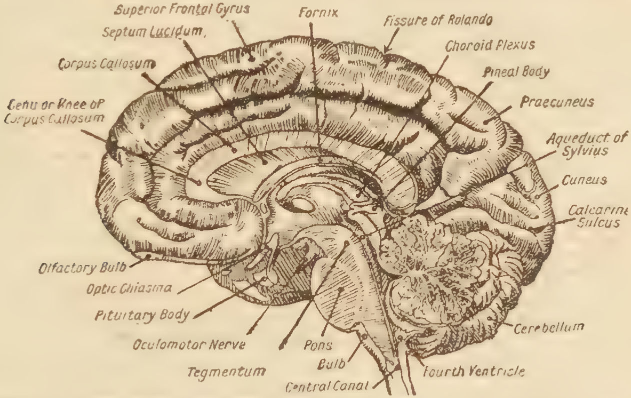

FISSURE OF ROLANDO
Frontal Lobe
Parietal Lobe
TOES
ANKLE
KNEE
HIP
ABDOMEN
CHEST
SHOULDER
ELBOW
WRIST
FINGERS
THUMB
NECK
INTERPRETATION OF SENSATION
FACE
LARYNX
BROCAS CONVOLUTION
PARIETO-OCCIPITAL FISSURE
HIGHER VISUAL
INTERPRETATION OF THINGS SEEN
Occipital Lobe
HEARING
ANTERIOR CENTRE FOR EYE MOVEMENTS
VISUO-SENSORY SEEING
TASTE & SMELL
Temporal Lobe

BRAIN. Control centres on the outer surface of the left side of the brain. The motor centres lie in front of the fissure of Rolando

Concussion may give rise to nothing more than giddiness or slight headache of short duration. Often, when recovering from stunning, the patient becomes sick and vomits. In worse degrees of concussion he is only semi-conscious, and it may be difficult to rouse him. His skin feels cold and the pulse is weak.

Concussion which is supposed to be due to a shaking up of the brain tissues, without actual gross damage, is usually recovered from completely. In other cases it is followed by a weakness of memory and headaches when mental work is attempted. A condition known as cerebral irritation sometimes follows concussion. It is due to laceration or tearing of the brain substance, probably of the frontal lobe. In this the patient is semi-conscious and manifests great irritability of body and mind, and usually after a few weeks he wakes up in a state of mental weakness or fatuity. In meningitis and abscess, headache is marked, the temperature is raised and there may be rigors or severe shivering. There may be intense intolerance of light and noise of any kind, vomiting and so on. Compression of the brain results in the profound unconsciousness known as coma. Paralysis may affect the limbs on one side of the body, or in the later stages both sides may become entirely powerless.

After concussion the patient should rest for some time, and in any but the slightest cases he should be put to bed. While awaiting the doctor, an attempt may be made to lessen the shock by putting hot-water bottles to his feet and by his sides. The room should be darkened and quiet. On no account, in any head injury, should alcoholic stimulants be given. When there are evidences of irritation or compression an operation to remove the cause of either may be the treatment indicated. In other cases the conditions mentioned for concussion are continued.

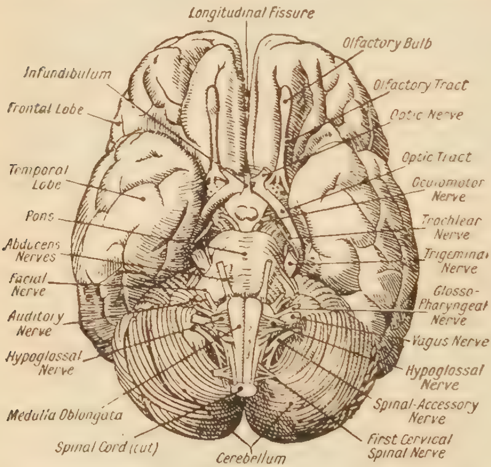

Superior Frontal Gyrus
Septum Lucidum
Corpus Callosum
Genu or Knee of Corpus Callosum
Olfactory Bulb
Optic Chiasma
Pituitary Body
Oculomotor Nerve
Tegmentum
Fornix
Fissure of Rolando
Choroid Plexus
Pineal Body
Praecuneus
Aqueduct of Sylvius
Cuneus
Calcarine Sulcus
Cerebellum
Pons
Bulb
Central Canal
Fourth Ventricle

BRAIN. Four main divisions: the convoluted cerebrum with the cerebellum at its base, the pons, and the bulb, continuous with the spinal cord

Inflammation of the brain substance is called encephalitis (q.v.), and, when the grey matter is specially involved, polioencephalitis. The latter condition is similar to the inflammation of the grey matter of the spinal cord, which results in infantile paralysis. It may be suspected when a child becomes suddenly ill and passes from one fit into another.

When the blood supply of a part of the brain is cut off, say, by an embolus, the part may die, and then it undergoes liquefaction or softening. Old people who exhibit mental deterioration are often said to have softening of the brain, and it may well be that, in consequence of a poor blood supply, there is degeneration of the brain substances.

Tumours of the brain usually produce certain classical symptoms, which are headache, vomiting, and optic neuritis, or, rather, a dropsical swelling of the optic nerve just as it enters the eyeball. Giddiness is another common symptom, and there may be mental changes. Some tumours can be removed successfully from the brain, and, where this is not possible, making an opening in the skull, an operation known as decompression, may be performed which may do much to relieve symptoms.


Longitudinal Fissure
Olfactory Bulb
Infundibulum
Olfactory Tract
Frontal Lobe
Optic Nerve
Optic Tract
Temporal Lobe
Oculomotor Nerve
Pons
Trochlear Nerve
Abducens Nerves
Trigeminal Nerve
Facial Nerve
Glosso-Pharyngeal Nerve
Auditory Nerve
Vagus Nerve
Hypoglossal Nerve
Hypoglossal Nerve
Spinal-Accessory Nerve
Medulla Oblongata
First Cervical Spinal Nerve
Spinal Cord (cut)
Cerebellum

BRAIN. Lower surface of the brain showing the origin of the twelve pairs of cranial nerves

BRAIN FAG. An excess of mental work, of worry or of excitement, especially when combined with an insufficiency of sleep, is likely to be followed by signs of brain fatigue—restlessness, insomnia, inability to concentrate on intellectual work, and so on. Alcoholic and sexual excesses and the abuse of drugs like morphine and cocaine, or of tobacco, tea and coffee, precipitate the onset of brain fag ; while some people are born with brain tissues which are unable to withstand even a moderate strain. Rest and the adoption of sound hygienic habits form an essential part of any treatment. *See* Fatigue ; Mental Hygiene ; Neurasthenia ; Weir Mitchell Treatment.

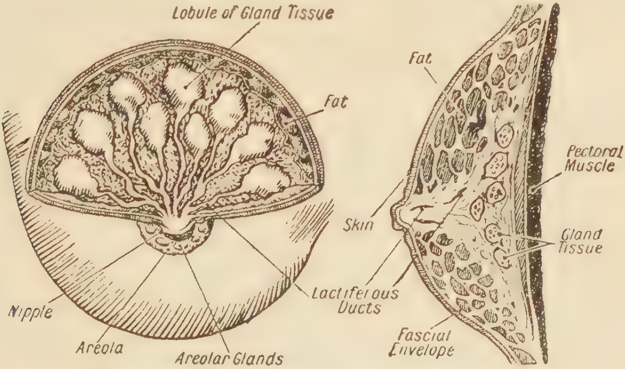
BRAIN FEVER. *See* Meningitis.

BREAST. The female breast consists of a number of separate glands embedded in fat, the ducts of which converge to open on the nipple. The pink zone around the nipple is called the areola. After puberty the breasts grow rapidly, and in pregnancy the glands take on active development for the formation of milk, while the areola enlarges and becomes dark in colour. Sometimes supernumerary or extra breasts are found on various parts of the body.

DISEASES OF THE BREAST. Diseases of the female breast are mainly related to the changes which take place in the organ at puberty, in connexion with the function of suckling, and after the change of life. Apart from wounds and other injuries, mastitis generally occurs during the few days following labour. It is caused by infection through the nipple, owing to this being handled with dirty fingers or otherwise contaminated. Should the breast become engorged with milk, or "caked," the danger of mastitis is increased. The treatment for a "caked" breast is to give a dessertspoonful of Epsom salts or some other saline in a little water, and to massage the breast through flannels wrung out of hot water. The movements are made from the base of the breast towards the nipple and continued till the organ is soft. The use of a breast-pump may help to reduce the engorgement. The breast should be supported by a bandage.

Should inflammation occur the breast becomes swollen and painful, or at any rate, one part will be found to be tender, and the patient develops fever. In these circumstances, the breast should not be rubbed, but hot applications may be made and the organ supported. The bowels should be moved freely with salts. The child should be taken off the breast. Should the fever persist for longer than thirty-six hours it is probable that suppuration is occurring, and when an abscess has definitely formed it should be opened without delay.

In women approaching the change of life chronic inflammation may affect smaller portions of the organ, being, however, much more diffused throughout it, and both breasts may be involved. Tiny cysts are formed in course of time, and one or more of these may swell sufficiently to give the feeling of a lump. In both forms of the disease there may be pain, which is often severe and tends to be worse at the menstrual periods. The first form may be sufficiently treated by supporting the breast and applying



BREAST. Internal structure, showing secreting and supporting tissues belladonna plasters for the pain. It may be said here that in order properly to rest the breast it is necessary to immobilise the muscle in which it lies. This is done by supporting the arm in a sling and binding it to the side. Similar treatment may help the diffuse inflammation, but more may be needed.

It will be evident, of course, that before starting treatment in these conditions the diagnosis must first be accurately made, as a lump in the breast may be one or more of a certain number of things. Among these, in addition to chronic mastitis, are a chronic abscess, cysts, adenomata or glandular tumours, sarcoma and cancer. The existence of a lump in the breast inevitably gives rise to a suspicion of cancer in a woman's mind, and such is her dread of her suspicion being correct and of an operation being necessary that she often keeps her knowledge of the existence of the lump to herself. Anxiety preys on her mind and makes havoc of her health and happiness.

This is quite wrong. Immediately she becomes aware of the lump she should put herself in the hands of her doctor. She will either discover that simple treatment is all that is required, or if an operation is necessary and the lump proves to be cancer she will give the surgeon a fair chance to eradicate the disease.

A chronic abscess occurs usually in pregnant women, and is sometimes of a tuberculous nature. The treatment consists of evacuation of the pus and measures to improve the general health. Cysts, it has been noted, may occur in chronic mastitis. Other forms are the retention cyst, or galactocele, which contains milk and which occurs in women who are or have been nursing; cysts due to irritation of the nipple, and so on. In some cases it suffices to lay the cyst open and pack it with gauze, but others should be removed.

Adenomata or glandular tumours are of several varieties. The commonest in younger women is the fibro-adenoma which appears as a small elastic lump with a fairly definite margin. It may be quite painless or, on the other hand, very painful. It should be removed. Sarcomata are found usually in women between thirty and forty years of age as roundish, somewhat elastic lumps, which rapidly increase in size. The glands in the armpit enlarge, and the growth is carried to other organs quite early in the course of the disease. It is not very common.

Next to the womb, the breast is the most frequent site for cancer in women. It generally happens after forty years of age. The left breast seems to be more often involved than the right, and the disease usually begins in the outer half. Irritation of the breast by badly fitting corsets, changes induced by blows or squeezes, and chronic inflammation of the breast are among the causes noted as possibly having a share in originating the growth. The disease is found in several forms, much the most frequent being that known as the scirrhus cancer. This is felt first as a hard lump, which may be painless or very painful. The skin at first moves over it quite freely. The glands in the armpit become enlarged and hard. If it is allowed to grow, sooner or later it becomes attached to the skin.

Whenever cancer is present, or any condition which may justly be considered to be cancerous, the breast and the glands into which its lymphatics drain should be removed at the earliest possible moment. The X-rays and radium are sometimes used after the operation with a view to preventing recurrence, and they may be used when recurrence takes place, and in cases which have been allowed to pass beyond the reach of operation.

Neuralgia of the breast, or mastodynia, specially affects young women who are anaemic and neurotic. The severe pain may arouse apprehensions of cancer, although pain in the breast is no more indicative of cancer than is the painlessness of a tumour evidence that it is not cancerous. The pain tends to increase in a marked way at the menstrual periods. Support to the breast and the use of belladonna plasters will be helpful, but earnest attention must be directed towards improvement of the general health.

Chronic eczema round the nipple will always give rise to the suspicion that it may be what is known as Paget's disease of the nipple, a condition in which eczema in this situation proves to be the forerunner of cancer in the underlying breast tissues. The suspicion will be justified if a thorough course of appropriate treatment fails to remove the eczema. The only prudent course, then, is to remove the breast, even although no definite tumour can be distinguished. *See* Baby ; Cancer ; Fissure ; Pregnancy.

BREAST FEEDING. The natural and proper food for an infant is breast milk. This contains all the food materials necessary for growth in the proper proportions, in the most digestible form, supplied at the proper temperature. Except in a few cases the mother's milk is free from infection with noxious germs, and the child is spared one of the undoubted risks of feeding with cow's milk. Only the gravest reasons can justify keeping or taking a child off the breast. The fact that the mother's milk does not appear to be sufficiently copious or to agree with the child is not a good reason, at any rate in the first place. An attempt should be made to improve the quantity and quality of the milk by giving plenty of nourishing food, and by ensuring that the mother takes sufficient exercise in the open air. Details with regard to the frequency with which the child should be suckled will be found under the heading Baby.

While suckling, a woman must be careful about taking purgative or other drugs, as some of these get into her milk and affect the baby. The doctor's advice should always be asked before doing anything of the kind. A child is weaned when nine or ten months old, but it may be kept at the breast longer if it is weakly, or if the time for weaning falls during hot summer weather, when the danger of polluted cow's milk is greatest, or if the child is sickly from teething or some other cause. *See* Baby; Childbirth; Milk.

BREATH, BAD. A foul breath may be due to decaying teeth, constipation, indigestion, alcoholism, or enlarged tonsils with decaying matter in the small cavities or crypts on their surfaces. In a form of chronic catarrh of the nose known as ozoena, the breath has a very offensive odour, though the patient is himself quite unconscious of it. Gangrene of the lung is among other causes of a bad breath. Mouth washes (q.v.) and scented pastilles may cover a bad breath, but the cause should be determined and remedied, if possible.

BREATHING EXERCISES. In breathing, air is drawn into the lungs by an increase in the capacity of the chest. This is brought about by a descent of the midriff or diaphragm and by the elevation of the ribs. In ordinary breathing the ribs are raised by the external intercostal muscles, the fibres of which pass from one rib forwards and downwards to the rib beneath. The air is forced out of the lungs by the elastic recoil of the ribs and of the abdominal wall, which has been forced forward by the diaphragm pressing on the abdominal contents. It follows from these facts that breathing exercises, to be of any use, must consist in taking full breaths. Exercises such as swimming, which develops the muscles passing from the chest wall to the arm, do not benefit breathing except in so far as they put one out of breath, and this, of course, can be achieved by running games, skipping, and others equally well. A course of graduated hill climbing is about as good a breathing exercise as could be suggested.

When doing breathing exercises, not only should the chest clothing be slack but that covering the abdomen also. Like all others, they should be done either in the open air or in a well-ventilated room. Another most important point is that breathing should be performed through the nose and not by way of the mouth.

Young children with poorly developed chests should be subjected to a thorough and prolonged course of breathing exercises. If the opportunity is lost the ribs become rigid and much less improvement can be hoped for. When there is definite blocking of the nose from adenoids, or from any other cause, the obstruction should be removed by operation before beginning the exercises. It is important that breathing exercises should not be practised by children with nasal obstruction without the advice and supervision of a doctor.

In performing breathing exercises of any kind, after the deep inspiration, it is an advantage to hold the breath for about ten seconds before breathing out. In the exercises which are done standing, the body should be held erect, though not in a stiff, strained attitude, and the shoulders should be thrown back. The following are a few typical exercises of this kind. Some are illustrated in Plates 14 and 15.

Each exercise may be performed five, ten or more times.

(1) While standing erect with the arms hanging by the sides, breathe in deeply, hold the breath, and then breathe out.

(2) This time, while breathing in, raise the arms from the sides, above the head, and lower while breathing out.

(3) Repeat No. 2, but raise the arms in front.

(4) As in No. 1, but with the hands pressing on the lower parts of the ribs at the sides. After a few days the exercise is done with the hands about the middle of the side of the chest, and a few days later on the upper ribs.

(5) Stand erect with the arms above the head, take a long breath, stoop forward slowly as far as possible, and breathe out while doing so ; rise again slowly, at the same time breathing in deeply.

(6) Assume a sitting posture, with the legs stretched out in front and the knees slightly bent and turned outwards ; with the arms held above the head and the fingers clasped, take a deep inspiration ; then stoop forward slowly as far as possible between the legs, bringing the hands to the lap, breathing out while doing so. Again, while breathing in, raise the body with the arms above the head. This exercise can be varied in the following way : while stooping forward take a deep breath, but so that the abdominal wall is pushed forward as far as possible—this means that the ribs are moved as little as possible—then breathe out slowly and repeat several times.

Breathing exercises are valuable not only for their effect upon the lungs ; they also improve the work of the heart and of the viscera. *See* Adenoids ; Lung ; Respiration.

BREATHLESSNESS. *See* Shortness of Breath.

BRIGHT'S DISEASE. Nephritis or inflammation of the kidneys is commonly known as Bright's disease. The varieties may be classified as acute and chronic. Acute Bright's disease usually occurs in the course of some acute disease, of which the most important is scarlet fever or scarlatina. It may occur also as a result of poisoning of the kidneys in diphtheria, typhoid fever, inflammation of the lungs (pneumonia), and in poisoning by mercury, Spanish fly and a large number of other irritant substances. It appears in some cases to follow exposure to cold, especially when this occurs in connexion with a drinking bout. It is a fairly common event in pregnancy.

In children the onset may be marked by the occurrence of convulsions ; the fact that fits in young children may be due to nephritis is not always remembered. The symptoms of the disease, however, may not be very pronounced ; the patient may complain of headache or of shortness of breath, or he may have a shivering fit and a small amount of fever. The pulse is rather more rapid than usual, the tongue is furred and the patient is generally constipated. The face is rather swollen, "pale, puffy, and pasty," and the ankles also may be swollen, but it is the swelling of the face that is typical of Bright's disease. This is due to the accumulation of fluid, and this dropsy may proceed to any extent and ultimately may be the cause of death by interfering with the action of the heart.

The most characteristic feature of acute Bright's disease is the diminution in amount of the secretion of the kidneys, and the fact that when chemically tested it is found to contain albumin; it also contains blood and casts from the kidney tubules. As a rule, this disease runs a rapid course; when properly treated, and especially when the treatment is commenced early, it is rarely fatal.

The treatment of acute nephritis essentially consists in rest in bed and milk diet. The patient is put between blankets and is clothed in flannel. The amount of milk given depends on the degree of dropsy present. If this is very great, fluids of all kinds have to be given sparingly. In addition to plain water, home-made lemonade containing a teaspoonful of cream of tartar may be given to drink. This helps to keep the bowels active, but it is usually desirable to give also doses of Epsom salts, sodium sulphate or some other saline, dissolved in a little water only. This is to get rid of water and poisonous substances by the bowel and so relieve the kidneys.

For this reason it is necessary also to keep the skin active. This may be accomplished by keeping hot-water bottles in the bed and sponging the patient with hot water, but hot baths may be necessary, or hot packs or a hot-air bath. Mindererus solution and other diaphoretic remedies are also sometimes used. Recovery is usually complete in about three weeks. The return to solid food should be gradual. Alcohol is inadmissible.

Chronic Bright's disease may succeed the acute form, or may arise of itself. In one form of the chronic disease, described as the hydraemic type, resulting from what is called the large white kidney, dropsy is present, and the urine may contain a large amount of albumin. The patient may note that his ankles and legs are swollen after being about, and his face puffy after the night's rest. The stomach is easily upset, vomiting may be frequent, and there may also be a tendency to diarrhoea. When the symptoms are pronounced the treatment must be similar to that of the acute stage, and at all times care must be taken to avoid chill by wearing suitable clothing. The diet should be plain and moderate.

In the other form of the chronic disease known as the azotaemic, the urine is abundant and watery, often containing only a trace of albumin, and there may be no dropsy, at any rate for a long time. It may be a sequel to one of the forms already described, or to arterio-sclerosis, a degeneration of the arteries. It may also occur independently of these. Lead poisoning, the abuse of alcohol, the immoderate use of rich food along with sedentary habits, and syphilis, gout and other diseases are amongst the underlying causes. Chronic dyspepsia, possibly mistaken for bilious attacks, and chronic bronchitis may be largely due to this form of kidney mischief. The first knowledge some people have of their kidneys being diseased is when they consult an oculist for dimness of vision.

Chronic kidney disease is followed by thickening and hardening of the arteries, and the blood pressure may be considerably raised. One consequence of this is a liability to rupture of a brain blood vessel with an apoplectic seizure. Bleeding may take place elsewhere in the body, and nose bleeding is particularly common. The heart becomes enlarged. This may be attended by troublesome thumping or even pain, while at some time evidences of cardiac failure, breathlessness, dropsy, etc., may manifest themselves. In nephritis there is always a possibility of fluid accumulating in the pleural or peritoneal cavity or in the pericardium. It has been pointed out that the structural changes and symptoms of nephritis are largely due to the retention of poisonous substances in the blood. When these are present in such quantities as to produce clamant symptoms the condition is called uraemia (q.v.).

The treatment of chronic Bright's disease in the earlier stages is not a matter of drugs, though, of course, these may be of value in relieving some of the symptoms that are apt to occur when the disease is farther advanced. In general the treatment is a matter of diet and attention to the sound rules of health. Constant attention to the diet is essential, especially since indigestion is very frequent. It should be smaller than the average, but if there is no dropsy innocent fluids must be freely taken. Meat once a day is sufficient, and there may be a liberal allowance of farinaceous foods and, with the proviso just noted, of milk. Salt should be restricted in the hydraemic type. In the azotaemic type a free supply of fresh vegetables is a necessary requirement of the patient.

The patient may carry on such work and recreations as he feels fitted for, but exposure to cold must be avoided. He must invariably wear wool next his skin and must encourage and facilitate the action of the skin by a regular use of baths. His danger is greatest during the cold weather; when possible, therefore, he should spend the winter, if in Great Britain at all, in its warmest parts; probably Bournemouth and Torquay are the most suitable places for patients suffering from this disease. The use of alcohol in any form is, in general, a danger. *See* Albuminuria; Arterio-sclerosis; Dropsy; Kidney; Uraemia.

BRILLIANTINE. The three different kinds of brilliantine—separable, inseparable, and solid—can be made as follows: Separable brilliantine is composed of 12 oz. almond oil free from acidity, 20 drops perfume, and 6 oz. absolute alcohol shaken well together. Inseparable brilliantine is made from 2 oz. castor oil, 8 oz. rectified alcohol (60 over-proof) and 60 drops perfume. Solid brilliantine is prepared from 4 oz. white vaseline and 10 drops perfume. *See* Hair.

BRINE BATH. A brine bath is often useful in chronic joint affections, and can be made at home by using coarse salt. The temperature of the water should be about 90° F., and the bath should last from 15 to 30 minutes. *See* Baths.

BROMIDE. There are several drugs of great use in medicine which owe their virtues to the possession of the chemical element called bromine. They are potassium bromide, sodium bromide, ammonium bromide and hydrobromic acid.

It is usually considered that the salt containing ammonium has a slightly stimulant action and is therefore preferable for use where the patient is depressed or weak; the salt containing sodium is neutral in this regard; that containing potassium has a slightly depressant action. Hydrobromic acid, the dose of which is 15 to 60 minims, is more rarely used than the salts, but it is of value in the treatment of whooping-cough, and is often combined with quinine, since it tends to avert the unpleasant symptoms—such as headache and singing in the ears—which quinine sometimes causes.

The characteristic action of all these drugs is upon the nervous system, which they depress uniformly throughout its whole extent; they have no other actions worthy of note. They are absorbed with extreme rapidity and are removed from the body with equal rapidity by means of all the possible organs.

The disease in which bromides are of especial value is epilepsy. They may be administered in large doses, often amounting to 200-300 grains a day, and the administration has to be continued for long periods. The frequency and the severity of the fits are both, as a rule, markedly reduced, and, indeed, the symptoms of the disease may entirely disappear.

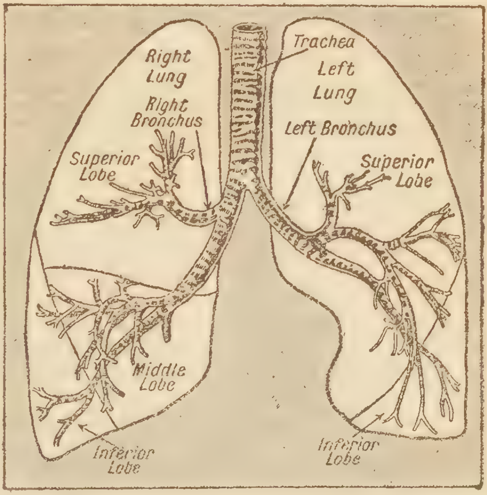
The bromides are also valuable in the treatment of sleeplessness, though, like all other drugs employed for this purpose, they are readily capable of abuse. They are of little value when the sleeplessness is due to pain or to other serious causes, but very successful when it is due merely to worry or overwork. The sleep produced is real sleep, which refreshes the patient. People who suffer from nightmare, and children who suffer from night terrors, are often benefited by bromides.

Much larger doses can be given in delirium tremens. Headache and many kinds of neuralgia are frequently relieved by bromides. These drugs are also given in various cases of spasm due to whatever cause—such as whooping-cough, lockjaw, poisoning by strychnine, and the curious symptoms often met with in rickety and weakly children which is usually called a "croupy cough." All forms of the drug are also extensively used in order to depress the sexual functions.

Full doses of bromides taken before going on board ship and during the voyage may help to prevent or lessen sea-sickness. The liquid preparations should be well diluted, and the best way to take one of the salts in powder is to dissolve it in half a glass of soda water. This applies to taking bromides for any purposes ; when taken with too little water they are apt to provoke sickness.

POISONING BY BROMIDES. In certain people, bromides cause unpleasant symptoms of poisoning, the condition being known as bromism. When large quantities have been taken for a long period, the patient becomes depressed, stupid and unable to work. The sexual functions are abolished, the skin loses its sensitiveness and frequently displays a rash, which is very similar to acne and is sometimes called bromide-acne. The symptoms are easily removed by stopping or reducing the drug.

BRONCHI. The air passages in the lungs are called bronchi, the word being the plural of bronchus. The trachea, popularly known as the windpipe, which leads from the larynx to the lungs, divides into two smaller tubes, one of which goes to each lung ; these are known as the right and left bronchus or bronchial tube. In the substance of the lung each of these divides and divides again, forming a sort of tree-like structure. When the bronchi become extremely small and lose their rigid character, owing to the absence of cartilage or gristle from their walls, they are known as bronchioles.



BRONCHI : The system of air tubes in the lungs

The bronchi are subject to various disorders, by far the most common of which is the inflammation of their lining membrane, or bronchitis. When the bronchioles are similarly affected the condition is much more serious, since the passage of the air to the air cells of the lung is seriously impeded. The bronchioles, which have a large quantity of muscular tissue in their walls, are very apt in certain people to be thrown into spasm, which naturally prejudices the act of breathing and which constitutes the basis of the symptoms of asthma. *See* Asthma ; Bronchiectasis ; Bronchitis ; Broncho-pneumonia ; Lung.

BRONCHIECTASIS. When one or more of the bronchi become enlarged, forming cavities inside the chest, bronchiectasis is said to be present. Inside these cavities matter is apt to collect and has to be expelled by tremendous bursts of coughing. The contained matter commonly decomposes, and in consequence of this the breath and sputum have a highly offensive odour. This disease may be due to the presence of a foreign body in a bronchus or be a sequel to other diseases of the lungs.

Such a cavity has been laid open and drained. Another method of treatment especially useful is to produce an artificial pneumo-thorax on the affected side. This means injecting air into the pleural cavity so as to cause collapse of the lung. Apart from these measures, treatment is similar to that for chronic bronchitis, while an attempt is made to get antiseptics into the bronchus by inhalation or by injection into the trachea. *See* Empyema.

BRONCHITIS: ITS CAUSES AND CURE

The Treatment of a Troublesome Form of Inflammation

The conditions which bring on this distressing complaint are here described after which suitable methods of treatment, including the use of the bronchitis kettle, are suggested. Similar articles in this volume deal with Asthma ; Pneumonia and other kinds of chest and lung troubles

Inflammation of the bronchi is experienced in various forms. It may be acute or chronic, and when acute may affect the larger tubes or the smaller, the latter being a very serious condition. An ordinary case of acute bronchitis is usually described as a bad cold in the chest. The inflammation affects the windpipe and the larger bronchi ; there is little or no interference with breathing, since the smaller tubes are not affected. It may be brought on by exposure to cold ; very often it is a symptom of another disease, such as influenza, measles, whooping-cough or typhoid fever.

The patient suffers from a distressing, racking cough ; often he has a sore throat and is hoarse, and there is some pain and sense of rawness behind the breast-bone ; he has scarcely any fever. At first the cough produces very little expectoration but is very painful. Later on expectoration is produced, and this becomes more and more abundant and the pain of the cough disappears. At first the sputum is tough, then white and frothy, but later it becomes mixed with yellow matter. The cough is usually worse at night and in the morning on waking up. When the doctor listens to the chest he hears little more than may often be heard by anyone who stands near the patient, that is, wheezing or whistling sounds, due to the passage of the air through the narrowed bronchial tubes.

There is no specific remedy for acute bronchitis. The disease runs its own course, lasting usually about a fortnight, and all that can be done is to make the patient as comfortable as possible meanwhile. The first items of the treatment are bed and a light, simple diet, such as gruel and slops. Some aperient medicine should be administered—as, for example, a dose of Epsom salts.

The pain of the cough and the rawness behind the breast-bone may be relieved by the use of drugs, such as ipecacuanha wine, in 10-minim doses three or four times a day, or one of the mild tinctures containing opium, such as paregoric; but as useful a means as any is rubbing the chest with hartshorn and oil, turpentine liniment or the acetic liniment of turpentine. This draws a quantity of blood to the skin and relieves the congestion of the bronchi that lie underneath. For children, camphorated oil is very often employed. Grown-up people who can stand something more vigorous may employ a mustard plaster, or, if necessary, a linseed poultice or the kaolin poultice, B.P.C., applied to the front of the chest and another placed between the shoulders.

The patient is much relieved by the breathing of warm and moist air. Dry, cold air irritates the bronchi and causes a great deal of painful and useless coughing, whereas he will cough very little if he is kept in a warm room, the air of which may be moistened by means of a steam kettle. A very useful measure also is the inhalation of steam containing Friar's balsam. In three or four days it becomes highly desirable to aid the patient in his efforts to cough up the secretion which is being produced in his bronchi. For this purpose the carbonate of ammonia is often given, usually in the form of sal volatile or the aromatic spirit of ammonia. This may be given in doses of half to one teaspoonful in a wineglass of water.

The very serious and frequently fatal kind of bronchitis in which the smallest bronchial tubes are involved is usually met with in children as a consequence of measles and whooping-cough, and in adults as a result of influenza. The symptoms in general are not very different from those of pneumonia or inflammation of the lungs. There is extreme breathlessness and the breathing is very rapid; the pulse is quick, there is a cough, the patient's face may become bluish, he is prostrated and has a dirty tongue. The temperature usually runs between 102° and 104° F.

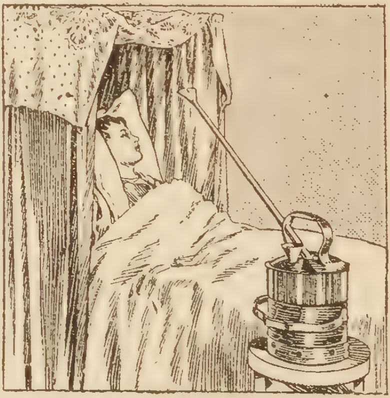
The disease may run a rapid course. If it is fatal the patient usually dies within a week, probably from induced broncho-pneumonia; otherwise he may recover.

The treatment of this severe bronchitis is as follows: the patient must be put to bed in a warm room, the temperature of which should be from 60° to 65° F. Although the air should be warm and moist, it must always be fresh. This is a most important point. There can be little doubt that many children who suffered from this disease have been killed by neglect of the importance of ventilation. The windows should be kept widely open, as there is less draught when they are so than when the opening merely consists of a narrow chink.

It is very important to support the patient's strength, for the danger of this disease is that he might die of exhaustion. The diet must be very light, milk and soda-water being the staple. The patient's chest may be wrapped up in a flannel jacket or in what is known as gamgee tissue. Hot fomentations may be applied, consisting of flannel wrung out of very hot water and having perhaps a few drops of turpentine sprinkled upon it; but the nurse must be very careful to see that the fomentations are light, so as not to interfere with the movements of the chest.

Various stimulants have to be given, such as sal volatile, whisky or brandy. Strychnine may also be employed, as well as digitalis and other heart stimulants. It may be said that, despite all temptations, no form of opium or morphia should be employed in this disease. The patient's distress may be relieved in other ways which do not entail the serious weakening of his breathing powers which is caused by these drugs.

A most important matter is to attempt to clear out the patient's bronchial tubes, so as to enable him to breathe. When the act of vomiting occurs there also occurs a muscular contraction in the bronchi which causes them to empty themselves of their contents, and this contraction is more efficient than can be obtained in any other way. Hence emetics are constantly of value in the treatment of this disease, especially in the case of children, whose coughing powers are feeble. There is probably no better emetic than mustard, this being not only efficient as an emetic but also stimulating to the heart and to the breathing. A teaspoonful of alum, or a teaspoonful of ipecacuanha wine, repeated if necessary, may also be given, these doses being appropriate for a child.


BRONCHITIS. Kettle for steam inhalation

If the breathing of a child should become suddenly very difficult and be accompanied by increased duskiness of the face, this may be due to collapse of portions of lung. While awaiting the doctor, place the child in a warm bath and sprinkle its body with cold water at short intervals. The object of this is to induce deep breaths.

Chronic bronchitis usually displays itself most markedly in the winter and is often called a winter cough; it rarely undergoes complete cure, but tends to recur with the cold weather and finally to become permanent. It occurs most commonly in people who have abused alcohol, in the gouty, in cases of Bright's disease, heart disease, and in the very old. In consequence of the constant coughing and the strain on the lungs which it produces, the lungs actually become enlarged. The name emphysema is applied to this condition.

It is the remoter consequence of the lung changes that leads usually in the course of years to the death of the patient, for the circulation of the blood through the lungs is interfered with, and this throws a great strain upon the right side of the heart, the business of which it is to force the blood through the lungs. Ultimately the heart breaks down.

The treatment of chronic bronchitis is, in the first place, the treatment of its cause if this is known, for example, alcoholism. If the patient can do so, he will benefit by emigrating to a drier climate such as Canada or Australia, or, if he can, to a warm island climate. He must persistently clothe himself in wool and must especially keep his feet warm. He will certainly prolong his life by breathing through his nose. Typical cough mixtures for chronic bronchitis are as follows:

Carbonate of ammonia	60 grains
Compound tincture of camphor	6 drachms
Syrup of Virginia prunes	4 drachms
Infusion of senega	to 6 ounces

A tablespoonful in water thrice daily after food.

Syrup of pix liquida	1½ ounces
Liquid extract of liquorice	2 drachms
Compound tincture of cardamom	3 drachms
Glycerin	4 drachms
Chloroform water	to 6 ounces

A tablespoonful in a wineglass of water three or four times daily.

These help to relieve cough, but there are two drugs which appear to help the underlying bronchitis; these are potassium iodide and cod-liver oil.

BRONCHITIS KETTLE. In cases of irritability of the air passages, as in bronchitis, croup, and so on, it is advisable to moisten the air which the patient is breathing. For this purpose a bronchitis kettle may be used. It has a long spout somewhat expanded at its outer extremity. In emergencies an ordinary kettle may be used, to the spout of which a tube of cardboard, brown paper, or even ordinary newspaper is attached. This should be stiffened by having a piece of cane or a thin stick attached to its upper surface.

BRONCHO-PNEUMONIA. This disease is closely allied to and is frequently induced by, acute bronchitis affecting the smaller bronchial tubes. The compound name is meant to imply that not only the lung tissue, but also the bronchi are affected. It must be distinguished from ordinary pneumonia, which usually starts directly in the lung tissues instead of spreading from the bronchi. Ordinary pneumonia is more common in adults; broncho-pneumonia is the usual pneumonia of children and also of the aged.

The temperature may rise gradually instead of suddenly as in ordinary pneumonia, and the disease may run a longer and more irregular course. The symptoms, the dangers and the treatment are similar to those of acute bronchitis, but it may be noted that this disease may kill by causing a very high temperature. In such a case the fever must be attacked by applying an ice bag to the head and by cold sponging of the patient's skin, or even rubbing the skin gently with blocks of ice. *See* Asthma; Bronchitis; Pneumonia.

BRUISE. Bruises are really wounds of the tissues underneath the skin. The characteristic colour of a bruise, as in a case of a black eye, is due to the blood which has been poured out into the tissues as a result of the injury. The changes in colour which a bruise undergoes are due to the changes in the red colouring matter of the blood as it is gradually absorbed and removed. The blue-black becomes brown and then green and yellow. The treatment consists in the application of cold and pressure at first and massage afterwards. The cold and pressure are of value only at the very first, before the bleeding inside the bruised tissues has stopped. If quickly applied they will often arrest the bleeding and thus limit the extent and duration of the bruise.

Pressure may be made through cloths wrung out of cold, perhaps iced, water, which are frequently changed. Cold should not, however, be long applied in the case of the aged or weakly. In the case of a black eye, care should be taken not to press on the eyeball but on the skin around it which has bone immediately beneath. Afterwards, gentle but firm massage is very useful, aiding in the removal of the blood and the waste products produced by the injury. At this stage bathing in hot water may relieve pain and reduce swelling. When the swelling has gone down, the disappearance of the discoloration may be hastened by applying compresses wrung out of a lotion composed of one part of surgical spirit to four parts of water, and covering with gutta-percha tissue.

Tincture of arnica has long enjoyed a quite undeserved reputation in the treatment of bruises. Any value it may have is due to the alcohol it contains. Moreover, it is a dangerous remedy if the skin is broken.

BUBONIC PLAGUE. *See* Plague.

BUNION. This very common deformity of the foot is the result of wearing boots or shoes which are too narrow, especially if they are also too short. As a consequence, a bursa forms over the great toe joint, which is liable to become swollen and inflamed. The treatment of bunions is dealt with under the heading Hallux Valgus. *See* Bursitis ; Foot.

BURN. The distinction between burns and scalds is simply that the latter are caused by moist heat such as steam ; the injuries produced are the same whether the heat be moist or dry. Burning is a very common accident, and many cases could be prevented by the knowledge and avoidance of certain risks. Young children should never be left alone in a room with an open fireplace or a stove, unless there is an efficient fire guard. Special care must be taken to keep from contact with naked lights flannelette clothing of any sort ; many children have been burnt from standing in front of a fire in a nightdress of this material.

The delicacy of a young child's skin is such that serious burning may be caused by applying an over-hot poultice. A hot-water bottle which is put into the bed of a patient who is unconscious —for example, one recovering from a general anaesthetic or who has a paralysed limb—should be well covered with flannel and, moreover, it should be placed so that it does not touch any part of the body.

A burn may only cause redness of the skin, or, in addition, blisters. If more severe, the skin may be destroyed partly or wholly ; the soft tissues may be damaged to a considerable depth. In addition, a burn of any severity is likely to be associated with the condition known as shock. It is important to remember that when this is so there may be no complaint of pain.

It is sometimes assumed that a child who has been severely burnt and who lies quiet and still cannot have suffered so much as might be expected. But the absence of crying has really a very grave significance. Children are much more likely to be affected in this way than are adults, except that in old people the results resemble those seen in children. Burns of the trunk are more likely to be attended with shock than those of the limbs, and large superficial burns rather than deep burns of a smaller surface.

In burns of any severity a doctor should always be summoned. In the meantime, shock may be treated by putting the patient to bed and placing hot-water bottles near him. Stimulants should be given freely, spirits or sal volatile in water, or tea and coffee. Putting a child in a warm bath has at once the effect of relieving shock and of permitting easier removal of the clothing.

Great gentleness should be exercised in taking away clothing from the burnt surface, and if, in spite of thorough soaking, it still adheres it is better to cut round the adherent piece. Pain will be much relieved by excluding the air from the burn by certain applications.

Where there is broken skin greasy applications should never be made. The reason for this is that they may make the subsequent cleansing of the burn much more difficult, so that septic contamination results. The aim in all burns is to keep them free from suppuration. Where, however, there is merely reddening of the skin, carron oil, eucalyptus or zinc ointment, vaseline, cold cream or olive oil may be applied. Powders are also suitable, for example, boracic acid or oxide of zinc. Bicarbonate of soda is a good remedy when made into a thick paste with a little water and spread on thickly. Paraffin preparations of the type of ambrine (q.v.) are suitable for this and for severer degrees of burning.

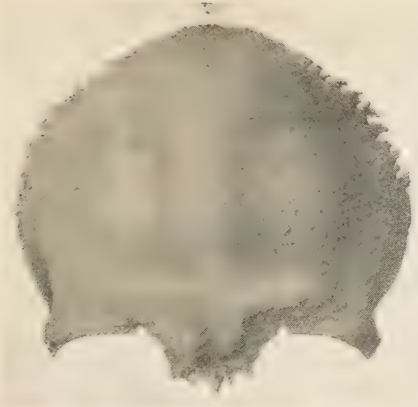
Large blisters should be pricked, the best way to do this being described under the heading Blister. The burns are then covered with cloths lightly wrung out of warm boracic solution, and this also applies to the severer degrees. In the case of a limb it may be immersed in a basin of water to which has been added a tablespoonful of boracic acid powder. When a burn has not gone beyond the stage of blistering, there is unlikely to be scarring, but in deeper burns scarring will follow. When the raw surface is very large, healing may be much hastened by skin grafting.

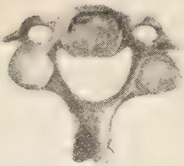
Burns resulting from corrosive fluids are dealt with under the heading Poisoning. *See* Ambrine ; Blister ; Carron Oil ; Graft ; Shock ; Skin.

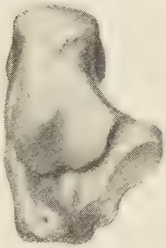
BURSA. This name is given to a little pocket, with a very smooth lining, which is usually closed, but which sometimes communicates with a joint cavity. Bursae occur in various parts of the body where it is necessary to avert the results of friction, and are thus found round most of the joints, such as the knee and elbow.

BURSITIS. Inflammation of a bursa is called bursitis. The acute form is indicated by a hot, reddened and painful swelling, the pain being increased on movement of the neighbouring joint. The treatment consists in rest and hot fomentations. Sometimes matter forms within the bursa and must be let out. Chronic bursitis, of which the commonest example is housemaid's knee, results in the bursa becoming distended with fluid. This is also found in a bursa over the elbow in miners and others who lean on their elbows when at work.

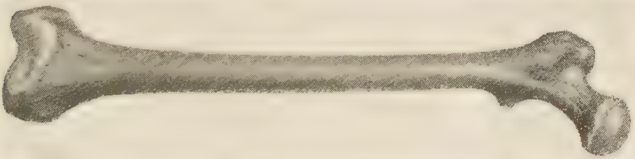
The form of pressure which is the cause in any particular case must be avoided, and absorption of the fluid may be hastened by painting the skin over the bursa with the stronger tincture of iodine and by applying an elastic bandage. If the fluid persists

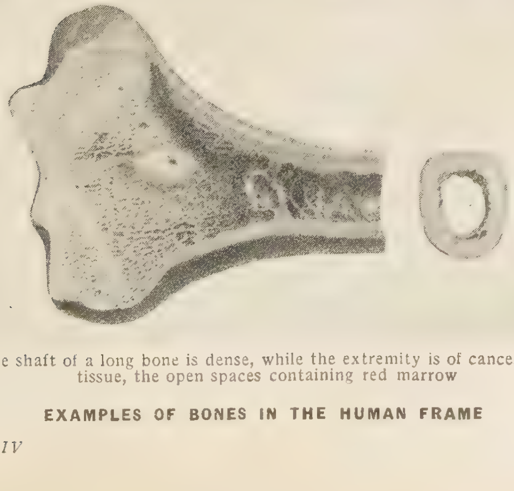






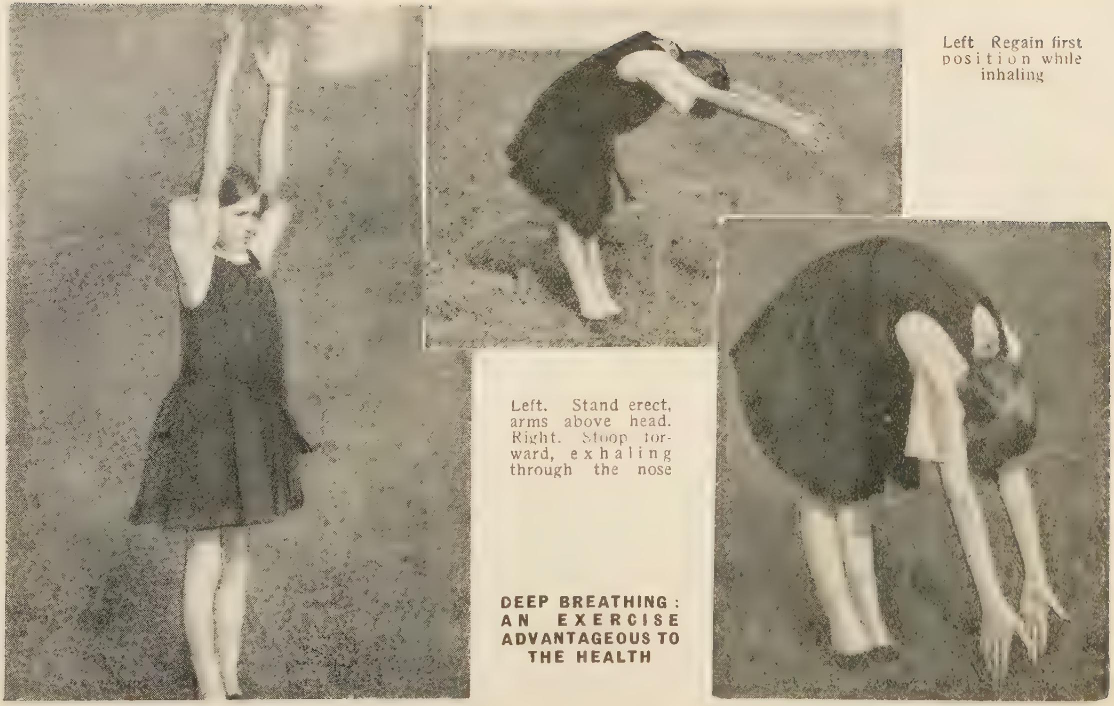
Bone. Examples of different types. 1. Flat bone (frontal) 2. Irregular (vertebra) 3. Short bone (heel) 4. Long bone (thigh)





The shaft of a long bone is dense, while the extremity is of cancellous tissue, the open spaces containing red marrow

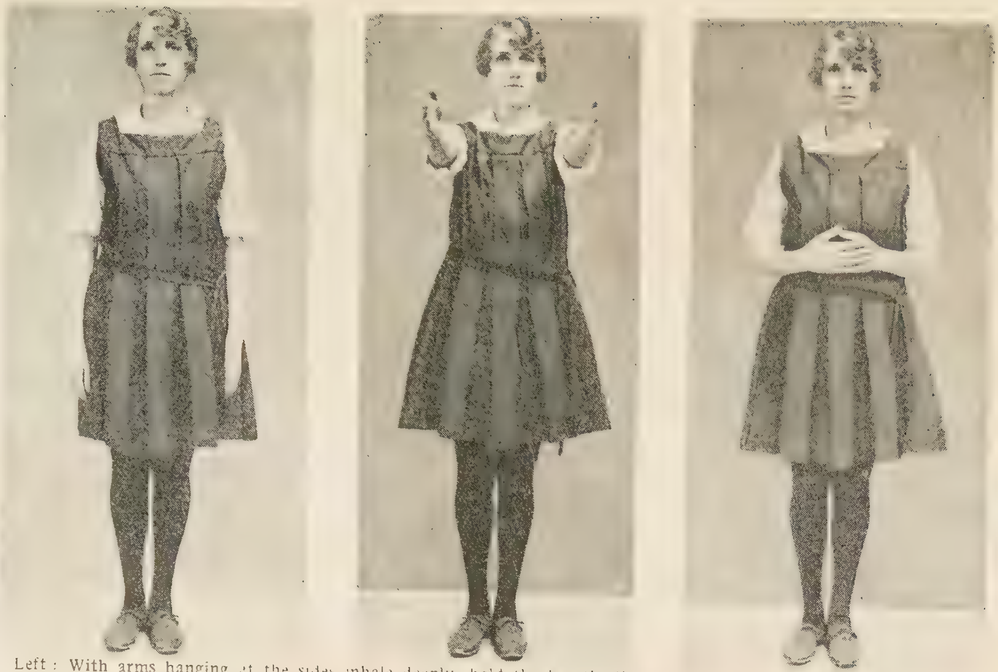
EXAMPLES OF BONES IN THE HUMAN FRAME



Left. Regain first position while inhaling

Left. Stand erect, arms above head. Right. Stoop forward, exhaling through the nose

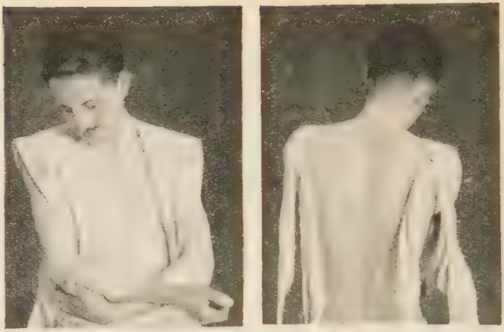
DEEP BREATHING: AN EXERCISE ADVANTAGEOUS TO THE HEALTH

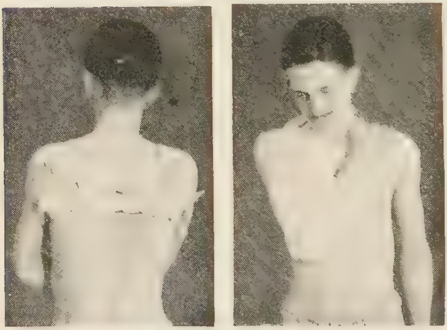


Left : With arms hanging at the sides inhale deeply, hold the breath, then exhale. Centre : While inhaling raise the arms in front and lower them while exhaling. Right : As left, but with hands pressing on the ribs

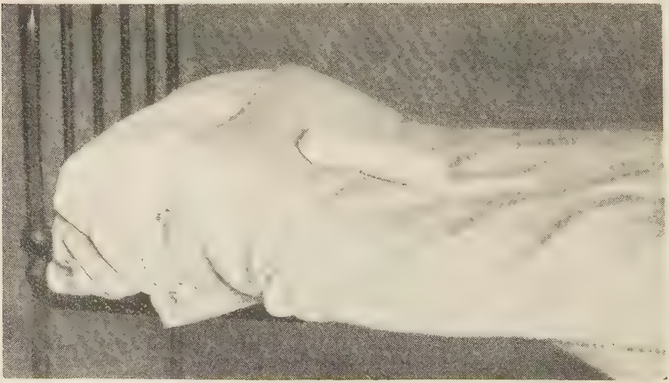
ANOTHER SIMPLE AND BENEFICIAL BREATHING EXERCISE

Right. 1. Two trianguar bandages are folded and laid over the shoulders. 2. Each is then tied behind the shoulder





Left. 1. The bandages are then knotted across the back as shown 2. Another triangular bandage is applied as a sling, the hand being placed on the sound shoulder



To diminish as far as possible the danger of deformity after a fracture of the collar bone, the patient may elect to lie in bed without a pillow and with a sandbag between his shoulders, instead of having the fracture bandaged; the position of the bag is shown

COLLAR BONE : TWO WAYS OF TREATING A FRACTURE

it may be necessary to withdraw it. The condition may be prevented by using a hollow pad under the knee or the elbow, as the case may be, and varying the part which takes the pressure. *See* Joint ; Knee.

CACHEXIA. Derived from Greek words meaning a bad habit, the term cachexia is applied to a condition, characterised by marked wasting and an unhealthy-looking grey or yellow skin, resulting from cancer, consumption, malaria and other diseases. *See* Emaciation.

CAECUM. The first part of the large bowel is called the caecum or literally the blind end. It is 2½ in. long and 3 in. broad, and forms a cul-de-sac below the entrance of the small bowel. The vermiform appendix leads off from the caecum. *See* Appendicitis ; Intestine.

CAESARIAN SECTION. The delivery of a child through the abdominal wall of the mother constitutes the operation known as Caesarian section. It becomes necessary when a child cannot be born in the natural way owing to deformity of the pelvis, obstruction of tumours and other causes. It should always be considered, however, in cases where birth by the natural route, although possible, is attended with serious risks to the mother or child, as the operation has a very small mortality when done either before or early in labour. *See* Childbirth.

CAFFEINE. The alkaloid caffeine is the active ingredient of tea and coffee and is found in other vegetable preparations. It stimulates the nervous system, the heart and the kidneys. The mental faculties are freshened, and the sense of bodily fatigue is removed or prevented by its use. If taken in too large doses this stimulation expresses itself in nervous and muscular irritability ; this may, perhaps, go to the extent of convulsions and delirium.

For some purposes it can be used as it exists in tea or coffee, but the drug is also extracted. It is a crystalline substance with a dose of 1 to 5 grains. There are some preparations made from it, amongst them being caffeine citrate, dose 2 to 10 grains, and effervescing caffeine citrate, 60 to 120 grains. All of these are used for headaches, and a valuable powder for this purpose is one containing 10 grains of phenacetin with 2 grains of caffeine citrate. Caffeine is recommended also for asthma, and 2 to 5 grains of the citrate may be given at bedtime and again during the night. *See* Coffee ; Tea.

CAISSON DISEASE. This curious disorder may attack men employed in building foundations of bridges under water, or in other work which necessitates breathing an atmosphere of compressed air. Severe pains may occur in the muscles of the limbs and trunk. It has been shown that when the person who has been subjected to compressed air returns to an atmosphere of the usual pressure little bubbles of gas escape from their previous state of solution in the blood and so form obstacles to the passage of the blood through the smallest blood vessels, especially those of the nervous system ; hence the symptoms of paralysis and loss of consciousness.

The malady is very rarely fatal. In all probability it may always be avoided by making certain that the transition from the atmosphere of very high pressure to the atmosphere of the usual pressure is a very gradual one. This is called decompression.

CAJUPUT OIL. A strong-smelling volatile or essential oil, cajuput is obtained from the leaves of a plant that grows in Singapore. Taken internally it acts as a carminative and antispasmodic, the dose being 1 to 3 minims. It is frequently used externally as a liniment mixed with two parts of olive oil, to relieve rheumatic and other pains. *See* Oil.

CALABAR BEAN. The seeds of this tropical plant yield an active principle called physostigmine or eserine. This is a very powerful poison when administered in large doses, but in minute doses is of great value to the oculist. It contracts the pupil and lowers the tension within the eye ; hence it is a valuable remedy in glaucoma (q.v.).

CALAMINE. The natural carbonate of zinc, known as calamine, after suitable preparation forms a smooth powder which is used in medicine as a local sedative and astringent. It may be used as an ointment, for example, 2 drachms of prepared calamine in an ounce of vaseline, or suspended in water as a lotion which is allowed to dry on. *See* Zinc.

CALCIUM. The chloride of calcium, dose 5 to 15 grains, and the lactate, dose 10 to 30 grains, increase the coagulability of the blood and hence are often used for the arrest of bleeding. They are also good remedies for chilblains and for nettlerash. Calcium hypophosphate, dose 3 to 10 grains ; calcium phosphate, dose 5 to 15 grains ; and the syrup of calcium lactophosphate, dose ½ to 1 drachm, are used as tonics for general debility. Lime is the oxide of calcium, and as slaked lime is used to prepare lime water. When this is added to milk it increases its digestibility. Lime water corrects acidity of the stomach and helps to check looseness of the bowels. It is often added to a baby's bottle feed. The dose for an adult is 1 to 4 oz., and for an infant ½ to 1 teaspoonful. Outwardly it has an astringent action, and enters into lotions for eczema, etc. Mixed with equal parts of linseed or olive oil it is known as carron oil (q.v.), and is used as a remedy for burns. It is contained also in the black and the yellow mercurial washes. *See* Chalk ; Chloride of Lime ; Mercury.

CALCULUS. The term calculus, literally a little stone, is applied to concretions of various kinds found in canals of the body. As might be expected, they tend to form specially in cavities which act as reservoirs, such as the gall bladder, the urinary bladder or the pelvis of the kidney. The materials of which they are composed come from the fluids in which they form, but usually there is a central nucleus consisting of dried mucus, blood clot or a small foreign body. A calculus may give rise to no symptoms till it begins to pass out from the cavity in which it has formed, when it may cause very severe pain, as in biliary and renal colic. *See* Bladder ; Colic ; Gall-stone ; Kidney.

CALF'S FOOT JELLY. When an invalid is allowed an addition to milk diet, calf's foot jelly makes a pleasant change. It has only a partial food value, but is useful when taken as part of a mixed diet. It may be made as follows : Take two calf's feet, wash them thoroughly and divide into pieces. Put into a saucepan with 5 pints of cold water, bring to the boil and boil gently for six or seven hours. Strain into a basin, and when cold remove all fat from the top. The flavouring of calf's foot jelly must depend on the patient's taste, but a pleasant jelly, palatable to most, is made as follows : Take 1 quart of the jellied stock and put it into a deep saucepan with the grated rind of 3 lemons, 1 inch of cinnamon stick, 2 cloves, ½ pint of sherry, a small teacupful of lemon juice, 6 oz. of loaf sugar and the stiffly beaten whites and crushed shells of 2 eggs. Whisk vigorously until boiling, then simmer slowly for ten minutes. Strain through a jelly-bag and pour into moulds or glasses. *See* Invalid Cookery.

CALLUS. During the process of the healing of a broken bone, new bone, or callus, is formed to repair the damage which has been caused. As a rule in a healthy person more callus than is necessary is formed, and after a few weeks the superfluous part is absorbed and disappears. But if the ends of the broken bone are not brought together, or if they are not kept at rest, a very considerable amount of callus is formed, and thickening at the site of the fracture may persist for a long time. *See* Fracture.

CALOMEL. The subchloride of mercury, or calomel, is a white, almost tasteless powder which is taken most frequently as a purgative, though it has other important uses. *See* Mercury.

CAMOMILE. Tea made from the dried flowerheads of camomile is used as a remedy for coughs and for infantile colic. It also acts as a digestive tonic. A breakfastcupful of boiling water is poured over about a dozen of the flowerheads and set by the side of the fire to infuse for 10 or 15 minutes. The infusion is then strained, sweetened and served hot.

CAMPHOR. Camphor is obtained from the wood of an Asiatic tree and occurs as tough crystals with a pungent taste. Its common preparations are camphor water, dose ½ to 2 oz. ; spirit of camphor, dose 5 to 20 minims ; compound tincture of camphor (paregoric), dose ½ to 1 drachm ; liniment of camphor (camphorated oil) ; and the ammoniated liniment.

When rubbed on the skin it causes redness and so acts as a counter-irritant. The ammoniated camphor liniment is used for chronic rheumatism, sprains and similar conditions. Camphorated oil is a useful liniment for rubbing on the chest in the bronchial complaints of children. Chaps are often treated by rubbing the skin with a camphor ball. Camphor helps to relieve itching, and may be used in a lotion such as the following :

Prepared calamine	I drachm
Glycerin	I drachm
Camphor water	I ounce

To be well shaken up before applying.

The following ointment acts similarly :

Zinc oxide powder	I drachm
Camphor powder	I drachm
Vaseline	I ounce

Camphor is sometimes used to check an oncoming cold. An adult may take 10 minims of the spirit of camphor on a lump of sugar. In small doses camphor acts as a heart stimulant and is used in pneumonia, enteric fever and other diseases. A solution in sterilised oil for hypodermic injection is the preparation usually employed in these cases. Camphorated chalk is a popular tooth powder. Camphor in vaseline can be sniffed up the nose to clean it, but this should never be used for infants, as collapse may occur.

POISONING BY CAMPHOR. In excessive doses camphor produces giddiness and a kind of intoxication. This may be followed by convulsions and unconsciousness. In cases of poisoning an emetic should be given and then strong tea or coffee, and water may be given freely. Hot fomentions should be applied over the heart, and hot-water bottles put at the feet and by the sides.

CANCER: ITS NATURE AND VARIETIES

What is Known About a Mysterious Disease

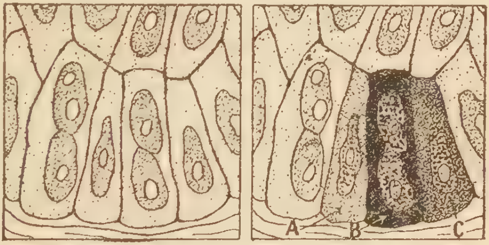
The value of the following article lies in the fact that a perusal of it will give the reader some idea of how he or she may avoid this fell malady. See also Dermatitis ; Radium ; Rodent Ulcer ; Sarcoma ; Tissue ; Tumour

Any kind of malignant tumour may be described as cancer, whether it be a sarcoma or a carcinoma, but nowadays it is almost invariably the latter which is meant when the word cancer is used. In this sense cancer is a tumour beginning in, and consisting of, epithelial cells. These are cells which cover the skin and mucous membranes, form glands and occur in other situations in the body. The cancer cells resemble those from which they are derived ; on the skin, for example, they are flat, in the breast spheroidal and in the bowel columnar, being also arranged in imitation of the glandular structure of the bowel lining.

Cancer cells are altered somewhat in appearance and size from the original cells, however, and they have the further important peculiarity that they invade the normal tissues by which they are surrounded and gradually replace them. This is one of the marks of malignancy distinguishing a cancer, say, from a simple fatty tumour. Another mark is that the cancer cells proceed along the lymphatics to lymphatic glands, and either from these, or through the blood vessels in the tumour itself, make their way into the blood stream, reach in this way the liver or the heart, and from the heart may be sent to any part of the body. The dissemination of a malignant tumour to distant parts is known as metastasis.

The secondary growths are always composed of the same kind of cells as the original growth, so that if the latter is in the bowel and a secondary growth occurs in the liver this will have the appearance of a bowel cancer, whereas, if the original growth were in the skin the liver tumour would be a flat-celled epithelioma.

Cancers vary very much in the amount of connective tissue which they contain. One which is found in the breast, the stomach and other organs contains a very considerable amount of connective tissue and is called a scirrhus, the literal meaning of this word being hard. The relative rate of growth of a scirrhus is slow. Where, on the other hand, the proportion of cells is very high, as in the soft or medullary cancer, growth is rapid. A form of skin epithelioma, known as a rodent ulcer, grows generally about the edge of the orbit and the side of the nose. It does not become disseminated, though, if untreated, it tends to eat deeply through the soft tissues and bone.



CANCER. Left, diagram of normal epithelial cells. Right, same group: A and C, cells in precancerous state; B, cancerous cell

Although cancer cells are derived from, and pertain to, the epithelial cells among which they grow, they differ from normal cells in that they have acquired an independent existence. They have ceased to belong to the commonwealth of cells which constitutes the body, and now act as rebels or predatory aliens.

In producing this change in the nature of the cells there are probably two factors, whether the new growth be a sarcoma or a carcinoma. The first is the presence of some exciting agent, the nature of which is still under discussion.

The second factor is some change in the body cells which makes them susceptible to invasion by the virus. This may be induced in various ways; in carcinoma it is due, in most cases, to chronic irritation. Chimney sweeps, working among soot, paraffin workers, and those who have to handle tar and pitch, often exhibit signs of irritation and often have cancer of the skin. A cancer of the tongue is often found associated with a jagged tooth or in men who smoke pipes with short, rough stems; in the latter circumstance the growth may be on the lip.

An epithelioma not infrequently forms on the site of old skin trouble due to syphilis and lupus. There is reason to believe that cancer of the breast and of the womb has followed chronic inflammation of these organs. There are grounds also for believing that cancer of the stomach may occur in those who take their food very hot, especially liquids. It is notoriously apt to occur on skin which has been badly burnt with X-rays or radium emanations.

The disease is not inherited; though a susceptibility to develop it in certain circumstances may be transmitted. But such an inheritance must play a relatively small part in producing the disease and need not be seriously considered. Moreover, there is no reliable evidence of cancer being an infectious disease.

Cancer in human beings may manifest itself in various forms. It may be a lump felt in the breast or the stomach. It may appear on a skin or mucous surface as a wart, or as a thickening beneath and around a sore or fissure. When it is near the surface it readily ulcerates. Irregular bleeding occurring in a woman after the age of 40 or thereabouts, and notably the supposed irregular return of the courses after they have apparently ceased altogether, are extremely suspicious symptoms of the beginning of cancer of the womb, and a doctor should always be consulted at once.

Cancer sooner or later causes deterioration of the general health. At the beginning worry probably plays a part, but later on there are bleeding, pain and interference with the functions of important organs by the primary or secondary growths. It must be emphasised that while pain may be severe in the later stages, it is not a common early symptom, and it may be disastrous if, for example, a lump in the breast is assumed to be free from suspicion of cancer simply because it is painless.

Cancer is not common before 35 years of age, but it may occur. It is more common in women than in men on account of the frequency with which the womb and the breast are affected. In men the most common sites are the stomach, the lower lip and the rectum. The disease would appear to be on the increase, though allowance must always be made for increased accuracy of diagnosis and for the increased number who reach an age when cancer is likely to develop.

In dealing with the probable causes of the disease, the role played by some kind of irritation has been emphasised. If people can be brought to realise the dangers lurking in certain substances with which they come into contact at work, and in certain personal habits, they at least know how a great deal of cancer could be avoided.

Chronic inflammation or irritation anywhere about the body should be cleared up if possible. If a lump, an ulcer, bleeding, or other possible signs of cancer develop, medical advice should be sought at once. An operation done in the early stages of the disease offers an excellent prospect of cure; an operation when the disease is thoroughly established, little or none.

Rodent ulcers can generally be cured by X-rays or radium, but in other forms of cancer this kind of treatment should be restricted to cases which have unfortunately passed beyond the reach of operation. In some of these cases treatment by rays may make an operation possible. In any case, much comfort may be derived in inoperable cases from their use. A considerable number of inoperable cases of cancer have been treated with injections of colloidal preparations of lead.

CANCRUM ORIS. A very acute and dangerous affection of the cheek known as cancrum oris sometimes attacks very weak children as a complication of measles. Want and insanitary surroundings are contributory causes. It is due to some specially poisonous kind of microbe, and must be treated by the surgeon with the utmost promptness and energy.

CANNABIS INDICA. This is the name of a drug sometimes called Indian hemp. It is generally given in medicine in the form of an extract or of a tincture, and is used for neuralgia, menorrhagia, pruritis and other conditions. It is largely taken in India as an intoxicant, being made into preparations of various names, such as bhang, haschisch and ganga.

CANTHARIDES. A drug which consists of the dried and powdered bodies of a beetle known as the Spanish Fly is technically called cantharides. It contains a substance called cantharidin, which is a very powerful irritant. A large number of preparations of this drug are used for external application, and the tincture, which must be used with great caution and never in doses of more than 5 drops, is occasionally given internally. The chief use of the drug is to produce blisters for counter-irritation. Preparations for this purpose are cantharidin plaster, blistering fluid, cantharidin ointment and tincture of cantharidin.

Since this drug has a special tendency to irritate the kidneys, it must never be given internally, save when those organs are known to be healthy; furthermore, since the drug is readily absorbed from the skin, it must never be used even externally without previous medical examination of the state of the kidneys. Nor must it be ever applied to a part of the body on which the patient lies, nor to paralysed limbs. In treating children, the aged and all weakly people, cantharides should not be used at all.

POISONING BY CANTHARIDES. Poisoning may follow improper administration of the drug. The symptoms are those of intense irritation of the alimentary canal and the kidneys. Treatment demands medical aid, but may be begun before the doctor arrives by putting the patient to bed, keeping him warm, and giving him large quantities of simple soothing drinks such as water and barley water, in order to dilute the poison and thus weaken its irritant action. *See* Blister; Counter-irritation.

CAPILLARY. The minute blood vessels which continue the circulation between the smallest arteries and the smallest veins are called capillaries. *See* Circulation of the Blood.

CAPSICUM. The pods of the capsicum plant are used to make cayenne pepper and certain medicinal preparations. When taken inwardly capsicum stimulates the flow of gastric juice and relieves flatulence; hence its use as a condiment, as a digestive stimulant in certain diseases, notably dipsomania, and its frequent inclusion in purgative pills where it is intended to prevent griping. When rubbed on the skin it has a stimulant effect, and so is used as a counter-irritant. Chilblains, provided that the skin is not broken, will benefit from being rubbed once daily with capsicum ointment or the B.P.C. stronger tincture. The ointment is popularly known as chilli paste and, with the liniment of capsicum, is a favourite remedy for lumbago and muscular pains elsewhere. Capsicum wool and capsicum gamgee tissue are used as applications for chest complaints and act like thermogene.

CARAWAY. The fruit of the caraway plant yields an essential oil which is used for flavouring medicines, and as a means of soothing an irritable stomach or bowel. Caraway water may be taken in a mixture, or the oil of caraway, dose ½ to 3 minims, may be given on a lump of sugar.

CARBOHYDRATE. This large and very important group of substances owes its name to the fact that they consist of carbon and of hydrogen and oxygen, the last two being in the proportions in which they occur in water. Their importance lies in the fact that they are most valuable foodstuffs owing to the carbon they contain, which is capable of being burnt up in the body, thus producing heat and energy. It follows that the proportion of them in the food should vary, strictly speaking, with the temperature, much less being needed in summer than in winter, and with the amount of physical exertion undergone by the individual. But it may be stated that about a pound of carbohydrates each day represents a suitable average amount for an adult of average weight and energy.

The chief carbohydrate foods are all the forms of sugar (cane sugar, grape sugar, milk sugar) and starch. While carbohydrates are capable of forming fat, they do not act otherwise as tissue builders. For this proteins are required. On the other hand, these can replace carbohydrates and fats as a source of heat and energy; but their use for these purposes is not economical. *See* Diet; Food; Starch; Sugar.

CARBOLIC ACID. Phenol or carbolic acid is obtained from coal tar. The common form in which the drug is employed is as a 5 per cent solution in water. This is diluted in various degrees according to the purpose required.

For the treatment of wounds, ulcers or burns at home the 5 per cent solution should have at least its own quantity of water added to it. This is used as a lotion, and then a piece of lint or gauze wrung out of the solution is applied as a dressing. If the dressing is covered with oil-silk or gutta-percha tissue, or anything that can prevent the carbolic acid from travelling outwards, a weaker solution is used, say, 1 in 60. The oil-silk must be applied so as to overlap the dressing at all points.

A 1 in 100 solution is often used as a gargle for sore throat, and the same strength is a useful application for the relief of itching of the skin.

Poisoning by Carbolic Acid. It must never be forgotten that carbolic acid is highly poisonous ; there are several cases on record of its having caused death by absorption from a large surface of skin to which it had been applied as a surgical dressing. Thus the drug is a poison in quite a special sense as compared with ordinary corrosive acids. These kill by means of their local destructive action upon the tissues with which they come in contact ; but carbolic acid will readily kill by means of its action on the nervous system without having caused the slightest local injury or irritation anywhere. In this respect it resembles oxalic acid.

In poisoning by carbolic acid much may be done before the doctor arrives. When, as is usually the case, the acid has been swallowed in concentrated form, there are two distinct dangers to meet ; first, the local action of the acid ; secondly, its effect upon the brain after it has been absorbed into the blood. The patient must be put to bed and kept warm. His stomach must be emptied, if possible, by means of a stomach tube or the application of a feather to the throat. White of egg may be swallowed in the hope that it will protect the surface of the stomach, but there are two proper antidotes. The first of these is chalk—plaster scraped off the walls may do—and the second is any kind of sulphate, such as Epsom salts.

The early signs of nervous poisoning by carbolic acid consist of deafness, noises in the ears, giddiness, stupidity and sickness. These symptoms will arouse the attention of anyone acquainted with them when they are exhibited by a patient who is being treated with carbolic acid either internally or externally. The urine becomes very dark, and any indication of this sort should be met by the instant administration of Epsom salts. *See* Poisoning.

CARBONIC ACID. The commonest compound of carbon and oxygen, carbonic acid is formed during the process of breathing by combustion, fermentation and putrefaction. It must necessarily escape from the body if life is to go on. Living continuously in an atmosphere containing an excess of carbonic acid results in a greater or less degree of ill-health expressed by loss of appetite, headache, lack of energy or indigestion.

When taken by the mouth in a state of solution in aerated waters, carbonic acid increases the palatability of the waters and imparts a sharpness which has a stimulating effect. In a good many states of the stomach and bowel soda and potash waters, which owe most of their properties to carbonic acid, act as sedatives, relieving pain and irritation and promoting recovery.

Carbonic acid is a poison producing a loss of sensibility and asphyxia. People who have gone to sleep near lime kilns or in rooms heated by charcoal braziers and not well ventilated, or having otherwise breathed air heavily charged with carbonic acid, suffer from asphyxia.

Carbonic acid solidified by cold and pressure is known as carbonic acid snow, and is used in the treatment of warts, birthmarks, lupus and other skin diseases. It acts by freezing and killing the tissues to which it is applied. *See* Asphyxia; Ventilation.

CARBON MONOXIDE. When combustion takes place in a limited supply of air, for example, in an anthracite stove, instead of carbonic acid there may be produced carbon monoxide. This gas, which is very poisonous, is also found in coal gas and in water gas. Its existence is one of the dangers attaching to the use of a geyser in a bath-room. It differs from carbonic acid in this way, that in poisoning by these gases the patient who has inhaled carbonic acid can generally have his blood easily cleared of the gas by artificial respiration, but when carbon monoxide has been inhaled it may be extremely difficult to do this on account of the gas forming a compound with the colouring matter of the blood, from which it does not readily separate.

People who are inhaling carbon monoxide may suffer from headache, nausea, giddiness and a sense of profound weakness. Later there may be convulsions, followed by unconsciousness.

When it is discovered that a room occupied by any person contains coal gas, the window should be at once thrown up or have a pane knocked out, and the gas should be turned off. The person, if unconscious, is then carried or dragged into the fresh air, tight clothing is loosened, and, if breathing has ceased, the mouth and throat are examined to ensure their being clear, and artificial respiration is started forthwith. A doctor should be summoned without delay. Inhalation of oxygen gas is one of the best methods of treatment.

Those who carry out the rescue should cover their mouths and nostrils with damp towels to avoid inhalation of the fumes, or the breath must be held while in the room. On no account should a naked light be used. *See* Artificial Respiration; Asphyxia; Oxygen.

CARBUNCLE. This is a name applied to a very painful and sometimes dangerous affection, which may best be described as a multiple or compound boil. As in the case of boils, carbuncles are most apt to occur in persons who suffer from some constitutional weakness, or in those who have actual disease, such as Bright's disease or diabetes. Its occurrence is usually later in life than that of boils.

The commonest site of the carbuncle is in the nape of the neck, after that the shoulders and the face. A painful, hard lump is felt beneath the skin, which becomes red or purple in colour. The lump soon softens and the skin gives way at several places, and through these openings the core of the carbuncle is seen as a greyish-white slough. The local inflammation of the skin and the structures immediately beneath it is accompanied by severe general disturbance, due to the absorption of poisons produced by the microbes in the carbuncle. The slough is gradually separated, but the process causes great exhaustion to the patient.

The treatment of a carbuncle must be prompt and energetic. It must be freely excised to expose the slough. This may be treated with pure carbolic acid or another strong antiseptic. Afterwards antiseptic fomentations may be used to assist the separation of the slough. In addition to these vigorous local measures, it is necessary to take every step to support the strength of the patient by a generous diet, alcoholic stimulants and tonics such as, for example, Easton's syrup, in teaspoonful doses thrice daily. The bowels must be freely opened. The flowers of sulphur, 20 grains, given with marmalade, or sulphur lozenges, may be given thrice daily, as sulphur appears to be a good remedy. *See* Boil.

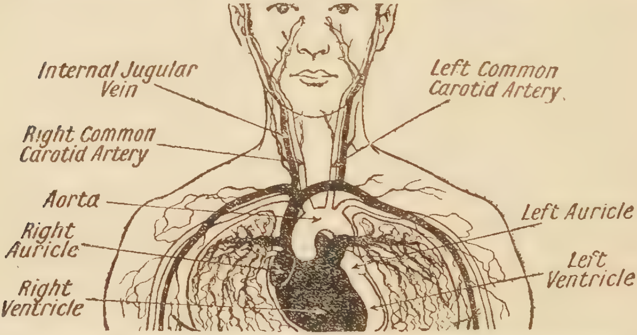
CARCINOMA. *See* Cancer.

CARDAMOM. The seeds of the cardamom plant found in Malabar contain an essential oil, which has a very pleasant odour and taste. The compound tincture of cardamom is often used for flavouring other medicines and also as a carminative (q.v.). The dose is ½ to 1 drachm.

CARIES. The literal meaning of the term caries is decay, and it is used to describe a process which affects only bones or teeth, in which these structures are gradually destroyed. In bone the hard substance is replaced by granulation tissue (q.v.), and the cause may be inflammation due sometimes to septic microbes, to tuberculosis, or to syphilis. Dental caries consists in the dissolving out of the earth salts in the tooth substance by acids formed in the mouth. *See* Bone; Necrosis; Teeth.

CARMINATIVE. Drugs which dispel flatulence and relieve colic are carminatives. They act by stimulating and regulating the movements of the stomach and bowels. Alcohol, ether, and even water have this effect, but the principal remedies of this class are the aromatics, or substances which contain a fragrant or pungent volatile oil. Examples of these are allspice, cloves, cinnamon, cascarilla, bitter orange, dill, anise and peppermint. For babies a teaspoonful of dill water is often used, and for adults a wineglassful of peppermint water. In either case the addition of a little bicarbonate of soda is an advantage, and the combination is supplied in a convenient form in sodamint tablets. *See* Flatulence; Indigestion; Oil.

CAROTID. The great artery on each side of the neck is called the carotid. In the first part of its course upwards it is called the common carotid, but later, at about the level of the Adam's apple, it divides into two arteries, called the external and internal carotids, one of which supplies the scalp and the face and other structures outside the skull, whilst the other is the great artery which supplies the half of the brain on its own side of the body. *See* Artery; Circulation of the Blood.



CAROTID ARTERIES. Diagram showing the arteries supplying blood to the face and the brain

CARRIER. It is often found that certain people have in their bodies virulent disease organisms which, if they are communicated to other people, produce their respective diseases. A person who harbours disease germs in this way is called a carrier of the particular disease. He may not himself have suffered from the disease; on the other hand, he may have had either an unmistakable attack, or one so slight that its existence was not noticed. When infectious disorders occur, the question of the existence of a carrier always arises and investigations are made accordingly. *See* Contagion; Infectious Disease.

CARRON OIL. This remedy, which owes its name to its having been introduced at the Carron Iron Works in Scotland, is still very popular in the treatment of burns. It consists of linseed or olive oil and lime water in equal parts. It is liable to become infected with germs, and therefore to be dangerous when the skin is broken. The addition of about 2 per cent of carbolic acid, which also helps to relieve pain, or of eucalyptus oil, 1 part in 8, makes it more reliable, but even then it is only suitable if the skin is unbroken. *See* Burn.

CARTILAGE. This tissue, which is popularly known as gristle, is found in various parts of the body, such as the larynx, which consists entirely of a number of cartilages. The ends of the ribs next the breast-bone are also made of cartilage. The larger number of the bones of the body were originally cartilaginous, or gristly. But besides these instances of cartilage there is another kind, called articular cartilage, which is of the first importance in the formation of movable joints. Wherever a bone is jointed with another bone the surfaces of the two bones which are to move upon one another are covered with a smooth portion of articular cartilage. *See* Bone; Epiphysis; Joint; Ossification; Tissue.

CASCARA SAGRADA. The drug known as cascara sagrada, literally "sacred bark," is obtained from the bark of the Californian buckthorn. It is a bitter substance which stimulates the movements of the bowels and also removes flatulence. The common preparations are the dried extract, dose 2 to 8 grains, the liquid extract, ½ to 1 drachm, and the aromatic syrup of cascara, ½ to 2 drachms. It is one of the few purgative remedies which does not require to be given in increasing doses to be effective, and so is excellent for chronic constipation.

As the dose appropriate for different people varies somewhat, it should first be ascertained in an individual case how much is required to produce an easy action of the bowels. This is taken each day, either a single dose in the evening or a smaller dose thrice daily, for ten days or a fortnight, and then the dose is gradually diminished. The dried extract can be taken in pills or tablets. The aromatic syrup is a good preparation to use for children, 10 drops being usually enough for a baby. *See* Aperient; Cathartic; Constipation.

CASEIN. The most important protein constituent of milk is known as casein. In milk in its original state casein is not present as such, but occurs in a fluid form, caseinogen, which is transformed into a solid so soon as the milk is subjected to the action of the juices of the stomach. This is due to the action of hydrochloric acid or of rennet. Much depends upon the way in which the casein is formed in the stomach, since, if the curd be light, flaky and loose, it is easily digested, whereas if it is a solid, dense mass the digestive juices are scarcely able to attack it.

In the case of a child, or an adult with weak digestion, some sort of precaution must be taken in order to render the milk fit for treatment by the gastric juices. One way of obtaining a light, flaky curd is to dilute milk with soda water. For a baby which is being fed on cow's milk the best substance for diluting milk is lime water. *See* Milk; Whey.

CASTOR OIL. The oil obtained from the seeds of the castor oil plant is a very efficient laxative; it does not cause griping, it is certain in its action, and it clears the whole length of the bowel. It is an old cure for diarrhoea due to the presence of irritating materials in the bowel. One or two tablespoonfuls are given and may be combined with 10 to 15 drops of laudanum.

It is, perhaps, the best opening medicine for pregnant women, and, if necessary, a teaspoonful or more may be taken each night. It is also the most reliable remedy for children; 15 drops may be given to an infant, and larger doses for increasing ages. It is well suited to those who suffer from piles or other painful conditions in the lower part of the bowel. Its use, however, is mainly for temporary constipation, and when this condition is chronic cascara is preferable.

There are several methods of taking castor oil so as to minimise its nauseousness. It may be taken with hot milk, or with an equal amount of glycerin, when half the intended dose of the oil will suffice. It is also obtainable in capsules.

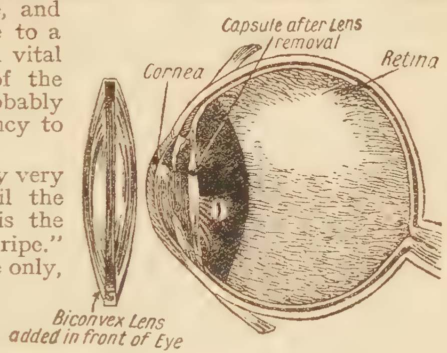
A drop of the warmed oil is a grateful application to the eye after the extraction of an irritating foreign body. Castor oil is often an ingredient of hair lotions, when it is mixed with spirit. *See* Aperient; Cathartic; Constipation.

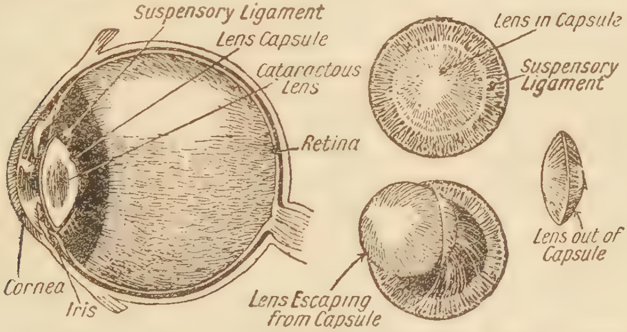
CATALEPSY. The extraordinary disorder of the nervous system known as catalepsy is very rarely witnessed, but is absolutely unmistakable to the expert eye. In catalepsy the patient—most frequently a young girl—is in a peculiar state of half-consciousness. She is quite unaffected by such things as a pinprick; she has lost her identity. There are no convulsions of the usual kind, but, in whatever position the patient is placed, there she will remain. Minutes may pass before an arm, held up in the air, gradually sinks down under the action of gravitation.

Recognition of this disease is simple, the only exception being a very important one. It is a fact that severe and prolonged states of catalepsy have been mistaken for death. There are numerous differences which only close examination can reveal. A state similar to catalepsy may be produced by hypnotism, and, apart from this, the phenomena appear to be of a hysterical nature. The usual line of treatment is to put the patient to bed. The necessary functions must be performed for her, both as regards feeding and the evacuations, and if this be done she will not suffer the slightest harm, even though she may continue in the condition for weeks. On recovery from the attack treatment will be adopted for the hysteria. Amongst drugs used in this condition, valerian possesses some value. *See* Death; Hysteria; Trance.

CATAPHORESIS. The process of passing drugs through the skin or any other tissue by means of an electric current is called cataphoresis. It doubtless possesses definite advantages in some conditions, such as painful affections of the joints. *See* Ionisation.

CATARACT. A very common disease of the eye, which consists in the loss of transparency of its lens, is called a cataract. All light has to pass through the lens, and if this becomes opaque absolute blindness is the result. The vast majority of cases occur in elderly people, and seem to be simply due to a degeneration, or loss in vital power in the tissue of the lens. There is probably some hereditary tendency to the disease.


Capsule after Lens removal
Retina
Cornea
Biconvex Lens added in front of Eye


Suspensory Ligament
Lens Capsule
Cataractous Lens
Retina
Cornea
Iris
Lens in Capsule
Suspensory Ligament
Lens out of Capsule
Lens Escaping from Capsule

CATARACT. How the diseased lens is removed and its function performed by a convex spectacle lens

The opacity is usually very gradual, and not until the entire lens is opaque is the cataract said to be "ripe." It may begin in one eye only, but the second eye is almost invariably attacked sooner or later. An average period of ripening is about two years. The first sign of the presence of cataract may consist in persistent tiny specks before the eye. Vision is then noticed to become progressively worse. The patient usually sees better in a dim light, though there are cases where a bright light is preferred. For a time after objects cease to be visible there remains a perception of light.

No treatment other than operation seems to affect cataract, but this method is exceedingly satisfactory. The lens is extracted when the cataract is ripe. In consequence of the loss of the lens it is necessary to provide the patient with an artificial lens, in other words, with spectacles having convex lenses like the natural lens. *See* Eye.

CATARRH. Inflammation of a mucous surface of the body, such as that of the lining of the nose or the stomach, is known as catarrh. Thus a cold in the head might be described as acute nasal catarrh. The word implies a discharge from the inflamed surface such as is seen in the running nose, but when there is little or no discharge the name is sometimes retained, as in dry catarrh of the nose or of the bronchial tubes. *See* Cold, Common; Gastritis.

CATECHU. Obtained from a plant which grows in Southern Asia, catechu contains tannin and so has a powerful astringent action. The powdered drug, dose 5 to 15 grains; the compound catechu powder, 10 to 60 grains; or tincture of catechu, 5 to 15 minims, may be given in the treatment of diarrhoea and other states of irritation of the bowel. Catechu lozenges are useful for a relaxed throat. *See* Astringent.

CATGUT. In surgery, catgut is used for ligatures in tying blood vessels or for stitching tissues together. Since it is an animal tissue, it is readily absorbed in the skin so soon as its work is done.

CATHARTIC. This term, which literally means a cleansing agent, is used as a general name for purgative medicines. These act by stimulating the movements of the intestines or by making the intestinal contents more liquid. When the latter effect is produced, the movements of the bowel become more vigorous in consequence, and drugs like Epsom salts act in this way. Other purgatives not only liquefy the stools but directly stimulate the muscle fibres in the bowel wall.

Cathartics may be grouped according to the nature of their effects. The mildest remedies of this class, the aperients or laxatives, simply produce softened motions. Amongst them are prunes, liquid paraffin and sulphur. When castor oil, senna, calomel, aloes, etc., are used, the effect is greater, the stools being semi-liquid in character. When still more powerful drugs are used, for example, elaterium, croton oil, jalap, podophyllin or scammony, the stools are watery.

Whenever the bowels act very briskly there is always some degree of reaction in the form of constipation, so that the use of powerful cathartics is bad treatment for chronic constipation. The degree of action of these remedies, however, depends on their dosage, and aloes, which is not suitable for treating chronic constipation when given in moderate or large doses, is quite a proper remedy if the dose is small. Cathartics which act briskly are likely to cause griping, and to prevent this aromatics are usually given with them, such as ginger, cloves or capsicum. Powerful cathartics should not be given to children, old people or those who are weakly, except on medical advice; they may easily depress the vitality to the verge of collapse. *See* Aloes; Aperient; Colocynth; Croton Oil; Enema; Epsom Salts; Jalap; Podophyllum; Rhubarb; Scammony; Senna.

CATHETER. In order to tap certain cavities of the body which are reached through narrow passages, tubes known as catheters are employed. A catheter is often introduced into the urinary bladder, sometimes to carry antiseptic lotions within, but usually to drain off the urine. Such may be made of metal, of soft rubber, of silk web stiffened with varnish, or of some other material.

An elderly man with an enlarged prostate may have to pass a catheter regularly for himself. He should never forget for a moment that his health, and perhaps his life, depends on the catheter being thoroughly clean when it is introduced, and by clean is meant free from contamination by microbes. It will help to this end if in the intervals between the times of use the catheter is dry and is kept in a dry receptacle. Long glass tubes or metal boxes may be procured for this purpose.

To disinfect the instrument before use, a rubber or metal catheter should be boiled for a few minutes, but as gum elastic or silk web catheters would be spoilt by boiling, they are disinfected by letting them lie, preferably for an hour, in an antiseptic solution, such as lotion of perchloride of mercury, 1 in 2,000.

Before handling the catheter the hands should be thoroughly washed with soap and water, and the end of the penis should be washed just before introducing the instrument. If lubrication is necessary, a little glycerin of borax may be used. After use the catheter should be well washed, inside and out, in running water. If there is difficuly in getting off grease a little methylated spirit will help. It is then thoroughly dried and put into its container. When a catheter becomes rough and worn it should be discarded. *See* Prostate.

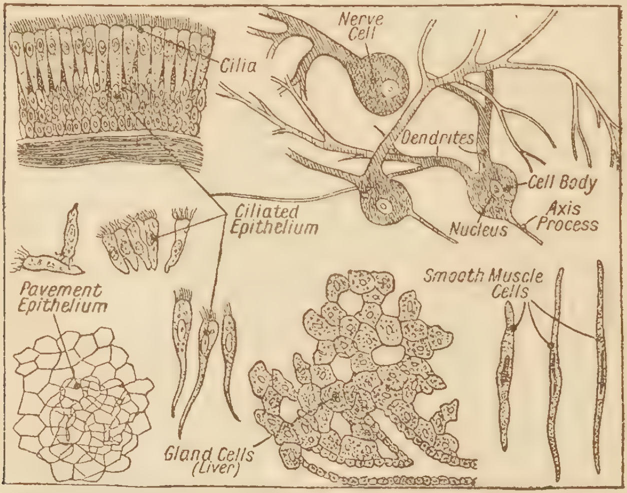
CAUL. This name is given to a cap formed on the head of a new-born child by a portion of the foetal membranes which cover it in the womb. It is an old superstition with sailors that if they take a dried caul to sea with them it will act as a charm against drowning.

CAUSTIC. Substances which have a destructive action upon the tissues to which they are applied are caustics. They may be solid or liquid. Typical caustics are nitrate of silver, usually called lunar caustic, caustic potash and caustic soda. It may be said that nowadays caustics have fallen out of use altogether, except in such cases as the application of lunar caustic, glacial acetic acid, or strong nitric acid to common warts.

Caustics cause great pain almost always. Their action is difficult to control and to limit ; furthermore, it is very difficult to secure healing after the use of a caustic, for it greatly weakens the vital powers, even of the tissues which it does not destroy. It is also known that the incautious and continuous application of caustics to various little growths—such as warts that may appear on the faces of elderly people—may cause them to become cancerous. Carbonic acid snow acts as a caustic, but the extent of its action may be fairly well regulated. *See* Blue Stone; Poisoning; Silver; Wart.

CAUTERY. The destruction of tissue, when necessary, is more satisfactorily accomplished by the cautery than by caustics, with the exception of corns or warts or such as can be dealt with by carbonic acid snow. There are many kinds of cautery, such, for instance, as the wire, or pair of wires, the tips of which are heated by passing electricity through them; or the cautery which is heated in flame. But every kind of cautery owes its powers to its high temperature, and the especial value of this instrument is that its action can be exactly limited as the operator desires. An advantage of the cautery is that it absolutely prevents bleeding from any tissue which it touches. *See* Thermo-cautery.

CELL. Every living thing consists either of cells—that is to say, minute bodies of various shapes each of which contains living matter, and is, up to a point, complete in itself—or else products of such cells.



CELL. Various types having different functions in the body's structure. Ciliated epithelium is found, amongst other situations, in the windpipe, and pavement epithelium in the mouth and gullet

Very many kinds of cells are found in the human body; for example, the flat, horny cells of the skin; the square or cubical cells that are found in glands and produce various secretions; the rounded fat cells; the elongated cells of muscle, which have the power of shortening and lengthening themselves; the many kinds of nerve cells; the cells of countless shapes which occur in various parts of the eye, the ear, and other organs of sensation; and many more than have yet been named, notably the white and red cells of the blood.

Reference in this book is made to various types of cells under appropriate headings. Here it is necessary merely to note that the modern study of disease may be said to date from the time when the true relation of these cells to the life of the whole body began to be recognized. *See* Amoeba; Blood; Epithelium; Lipoid; Protoplasm; Tissue.

CELLULITIS. Inflammation of the loose cellular tissue lying beneath the skin and between muscles is called cellulitis. *See* Inflammation.

CEREBELLUM. *See* Brain; Equilibrium.

CEREBRO-SPINAL FEVER. The acute, infectious disease which is more popularly known as "spotted fever" is called by doctors cerebro-spinal fever because, although like other specific fevers, it is a form of blood poisoning, yet the main brunt of the disease falls on the coverings or meninges of the brain and spinal cord. On this account it is also sometimes called epidemic cerebro-spinal meningitis.

The blood poisoning and the meningitis are caused by a germ known as the diplococcus intracellularis; of this there are four types, any one of which may be present in an individual case, and which vary to some extent in their virulence. These germs invade the throat in the first place, and are often found in the throats of people who have had the disease and also of others who do not themselves suffer from it, but who can communicate it to others.

In any community there are always carriers of cerebro-spinal fever, and this danger increases in a marked degree when people are crowded together. Epidemics of the disease are therefore liable to break out in barracks, camps or elsewhere where overcrowding occurs, and for this reason they also occur most frequently during the cold months of the year. Doubtless dirt and bad sanitation of other sorts play a contributory part. In addition to these epidemic outbreaks, individual cases occur from time to time.

Children are most frequently affected, but people of any age may contract the disease. It is most fatal in the young and in the old. It usually begins suddenly, severe headaches and vomiting being common early symptoms and sometimes being wrongly ascribed to food poisoning. The patient becomes very irritable and cannot tolerate noises or bright light. Later he is semi-conscious and delirious.

Two symptoms make their appearance early, the first being a painful rigidity of the muscles at the back of the neck, so that the patient complains if any attempt be made to bend the head forward; the other is what is called Kernig's sign. This means that when the patient lies on his back, if a thigh is bent to about a right angle with the body and an attempt made to straighten the leg at the knee, great pain is caused. It may also be noticed that the eyes are squinting, and other nervous symptoms may be present, for example, convulsions in young children.

So far all the symptoms described have been due to meningitis. The fever present is partly due to the same cause but also to the blood poisoning, and other effects of this may be reddish or purple spots on the skin (whence the name "spotted" fever), and inflammation of the joints, the lining and the covering of the heart, and other parts. Inflammation of the kidneys may be present, and in some cases has been the only symptom. Sometimes large patches of discoloured skin or purpura are found, these and the spots being due to bleeding under the skin.

Persons who contract this disease must be isolated, and all who have been in contact with them must have their throats examined to determine whether they harbour the germs; meanwhile, they also are isolated. Treatment consists in tapping the spinal canal, described under the heading Lumbar Region, so as to permit of the escape of the excess of cerebro-spinal fluid, and the injection into the canal of the appropriate anti-meningococcic serum. This may also be injected into the ventricles of the brain and into a vein. At the same time vaccines, made from the germ, are generally used.

The patient may have to be fed through a tube, and in cases which last any length of time precautions must be taken against the occurrence of bed sores. Recovery may be complete, but in some cases squinting, defective eyesight, deafness, paralysis of one or more limbs or mental impairment may be left. Patients may retain the germ of the disease in their throats for months after recovery, and it helps to remove them if a large amount of time is spent in the open air. This is highly desirable for all sufferers. *See* Meningitis.

CEREBRUM. *See* Brain.

CHAFING. From the rubbing together of two skin surfaces of the body chafing may result, that is to say, the skin becomes red and painful, and perhaps raw. This may also ensue from the rubbing of tight clothing. Common sites are the armpits and the inside of the top of the thigh, and in both these instances the decomposition of sweat is doubtless a factor. Scrupulous cleanliness will do much to prevent and cure this condition. The parts should be washed daily with soap and water. Dusting powders are also useful, or zinc ointment or cold cream. *See* Eczema; Erythema; Intertrigo.

CHALK. Calcium carbonate or chalk has various uses in medicine. When ground into powder it is called prepared chalk, and in doses of 10 to 60 grains may be used for acidity of the stomach. Its frequent use for this purpose, however, may lead to the formation of lumps or concretions in the bowel. For diarrhoea, chalk mixture, dose ½ to 1 ounce, aromatic chalk powder, 10 to 60 grains, or the aromatic chalk powder with opium, are useful remedies. *See* Calcium.

CHALK STONES. In people suffering from chronic gout, deposits are found in the ears, the eyelids, the knuckles and elsewhere, which are known as tophi or chalk stones, but which really consist of urate of soda. *See* Gout.

CHANCRE. A venereal sore, which may be either of the hard or soft variety, may be described as a chancre, though usually nowadays the term means the hard sort, while the soft chancre is referred to as a soft sore. The former is the primary lesion of syphilis and may appear from three to five weeks after contagion ; the latter appears a day or two after the impure connexion, as a dirty yellow ulcer which discharges pus. The glands in the groin may become swollen and an abscess may form, particularly if the person walks about. A soft sore can generally be cleared up quickly by antiseptics, but, as the infection of syphilis may also be present, a doctor should always be consulted. *See* Syphilis.

CHANGE OF LIFE. The period in a woman's life when the reproductive functions come to an end is popularly known as the change of life. Technical names for this time are the menopause and the climacteric. It usually occurs between the ages of 45 and 50 ; very rarely later than the latter date,but not infrequently earlier than the former.

The change is signalised by the cessation of the menstrual periods. This may happen all at once or the periods may occur irregularly for two or three years before disappearing altogether. The importance of the change of life from the point of view of the health of the individual lies in the fact that it is very often accompanied by various unpleasant nervous symptoms. The patient's temper may suffer, and so may her digestion and also her sleep ; she is very apt to have hot and cold turns and she flushes very readily. She very frequently tends to put on flesh ; but the tendency may be in the other direction. At times she may suffer from headache, though this may really indicate the need of glasses for reading and other near work. Amongst other disorders which may make their appearance at this time, mention may be made of inflammation of the joints or osteo-arthritis (q.v.).

It must be emphasised that irregular bleeding at or shortly after the menopause must be viewed with the strongest suspicion in view of the tendency to the development of cancer of the womb at this time. Therefore its occurrence should always be brought to the notice of a doctor.

The disagreeable incidents of this period may be diminished by regular, careful living ; sufficient open-air exercise, sufficient sleep, a careful diet and attention to the bowels. A change of air from time to time is often of great service. Tea should be drunk in moderation and should not be strong, while alcohol is best avoided altogether.

The flushing may be relieved by the use of potassium bromide, 15 grains in half a glass of soda water from time to time. An effective remedy is sometimes found in ichthyol. A tablet of 2½ grains is taken thrice daily after food, and the number is gradually increased until in about three weeks' time four tablets are taken thrice daily. After a day or two the drug is dropped, and this should be done if at any time during the course the patient has a persistent taste of the drug in her mouth. Flushing and other disagreeable incidents of the change of life are often successfully treated with ovarian extracts. *See* Menstruation; Obesity.

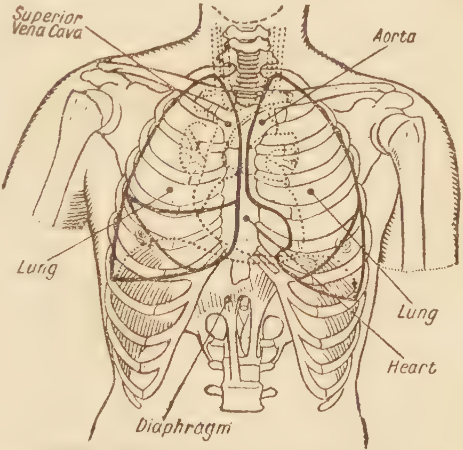
CHAP. Chaps are due to a lack of healthy elasticity of the skin induced by its exposure to cold. The effect of cold is to prevent much blood from circulating through the skin, that is to say, to make the skin dry. If now the skin is put on the stretch it tends to crack. Though the cause of chapping is thus mainly the dryness of the skin, it must be remembered that the worst thing for chapped hands is to leave them imperfectly dry after washing. This is by far the commonest way in which chaps are caused, more particularly when the hands are dried at the fire.

In washing, hard water should be avoided if possible, and if only such is available, it should be softened by the addition of a little washing soda or borax. Towels must be perfectly dry, and it may be advantageous to have a little bowl of bran on the washstand into which the hands may be plunged after drying. Some people find that rubbing lanoline into the hands at bedtime is useful in cold weather. Others use glycerin and rose-water. Should chaps form, they must be protected from contamination like any other wound, or they may become septic. They may be painted over with flexible collodion or "new skin," or anointed with boracic ointment and covered by bandages or clean cotton gloves.

Chapped lips may be prevented by using a lip salve or rubbing on lanoline, cold cream or a little vaseline before going out into the cold. When they exist they are often aggravated by frequent moistening of the lips or by biting the lips or picking at them. They should be treated by putting on boracic ointment at night. Deep sores on the lips should not be allowed to persist; they may lead to ugly scarring and they may be dangerous. *See* Chilblain; Skin.

CHARCOAL. Wood charcoal is of considerable use as a drug in some cases of indigestion. It has the power of controlling fermentation in the stomach, and, beyond this, also tends to absorb gases formed in indigestion. It must be taken dry in doses of 60 to 120 grains, either as lozenges or sprinkled on bread-and-butter. Its property of absorbing gases is utilised in the treatment of foul sores, to which it may be applied sprinkled on a poultice. By absorbing the gases it destroys the disagreeable odour attending such sores. Charcoal is often used as a tooth powder.

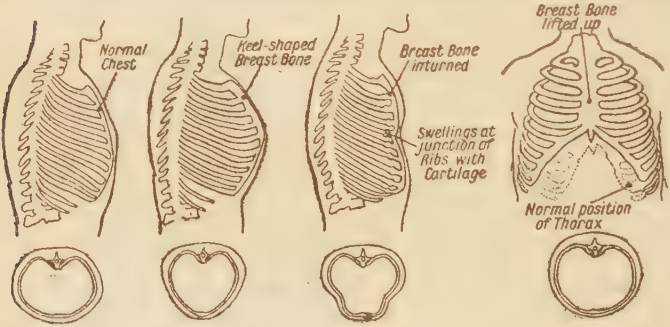
CHEST. The upper section of the trunk, the chest, is technically known as the thorax. The important organs it contains are the lungs, which take up the greater part of its space, and the heart. The chest has more or less the shape of a cone, expanding below and diminishing upwards. It is bounded below by the diaphragm, through various openings in which it communicates with the abdomen. The principal structural foundation of both chest and abdomen is furnished by the spine, but whilst the walls of the abdomen are entirely soft but for the spine, the part of the spine which helps to form the chest gives origin to 24 long curved bones called ribs, which help to form the wall of the chest. In front, the ribs, with the exception of the last two pairs, are attached in some way to the sternum or breast bone. They are capable of movement by the muscles attached to them, and thus help in that process of breathing for the discharge of which the whole chest is designed.



CHEST. Its structure and principal contents

The girth of the chest, which is usually measured about the level of the nipples, is in men usually from 33 to 40 inches, but the most important fact is the difference in girth during inspiration and expiration respectively, or, in other words, the range of movement. The phrase a weak chest is a vague one to which often very little meaning can be attached. It may mean that a person has a small chest, and if there is also a poor range of movement it is reasonable to suppose that such a chest implies, perhaps, some defect of vital power and an increased risk of pulmonary complaints, as may also the conjunction of a narrow chest with little flesh upon it, sloping shoulders and a long, thin neck. But the early stages of consumption may produce somewhat similar appearances. Any person whose chest exhibits any of these features should be much in the open air

The barrel-shaped chest is frequently met with in elderly people, as a consequence of chronic bronchitis with much coughing, which has caused the chest to become enlarged, in order to make space for the overstretched lungs. Two familiar deformities of the chest are due to rickets. Of these the most marked is what is called pigeon breast; this is favoured by the existence of adenoids or by diseases, like whooping-cough, which interfere with breathing while the ribs are still soft and malleable. The other consists of a series of so-called "beads" upon the ribs, due to their being swollen at certain points of their junctions with the cartilages connecting them with the sternum. Usually there is one such swelling on each rib at a corresponding place. The deformity thus produced is often called the "rickety rosary."



CHEST. Normal chest and three types of deformity; pigeon breast, rickety rosary and (**Right**) barrel-shaped chest. **Below,** sectional aspects

Pain in the chest may be due to disorders of any of its contained organs or their coverings, reference to which will be found under their appropriate headings. It may be due to rheumatism of the intercostal muscles or pleurodynia. In some instances, however, it is due to disorders of the stomach. *See* Breathing Exercises; Heart; Lung; Pleura; Pleurodynia; Poultice; Respiration; Shingles; Thorax.

CHICKEN. Breast of chicken is the most easily digested meat known, and is thus of great value in invalid and convalescent cookery. A young bird should always be chosen, as the meat is more tender and of finer quality. Chicken broth is of value in fevers, chicken cream, mince, and fricassee are suitable for the early stages of convalescence, while roast chicken may be given when the patient is put on a more substantial diet.

A good chicken broth suitable for invalid diet is made as follows. Half a chicken is used, the white meat from the breast being removed for serving separately or for adding later to the broth. The remainder is well washed, the fat and skin are removed, the meat cut into small pieces, and the bones broken. This is then covered with about two pints of water, to which a pinch of salt is added, and allowed to simmer gently for four to five hours, water being added if the meat becomes uncovered. The broth should be skimmed at intervals. It is then strained through a fine sieve, left to get cold, and any fat then removed. If the breast is to be used, it is first pounded in a mortar and rubbed through a sieve, then added to the reheated broth, with a teaspoonful of fine tapioca or barley, and simmered until the latter is cooked. *See* Invalid Cookery.

CHICKEN POX. A very common infectious disease of childhood, chicken pox is technically known as varicella. Chicken pox is exceedingly infectious, and few children escape it. It is most common in children under six years. The microbe which causes it has not yet been identified. The disease usually shows itself about fourteen days (eleven to nineteen) after infection ; in other words, the period of incubation is a fortnight. The rash, consisting of small red spots, appears on the first day of the symptoms, which are those of slight fever (q.v.). The chest, the back, and the limbs are most affected. The rash may also occur on the face and scalp, and in the mouth, making swallowing painful. In a short time the spots turn into blisters ; soon these dry up and leave crusts which become detached. As a rule no permanent scarring results, except where the child has scratched the spots.

This is a mild disease ; there are no complications except in the very rarest cases, when inflammation of the kidneys or broncho-pneumonia may occur. The patient should not be allowed to mingle with his playmates until all the crusts have separated, including those amongst the hair ; he should have a course of warm baths and a new outfit of clothes. Second attacks of this disease occur sometimes, but they are not common.

The treatment is that of a mild case of fever ; warmth, slop food, and a mild laxative for the bowels if necessary. If any of the spots ulcerate, they should be smeared with an ointment consisting of equal parts of vaseline and white precipitate ointment. This or some zinc ointment may also relieve itching. Children who have been in contact with others suffering from the disease should not return to school till three weeks have elapsed since the last contact. From time to time chicken pox is put on the list of notifiable diseases. *See* Infectious Disease ; Smallpox.

CHILBLAIN. Strictly speaking, a chilblain is a local inflammation of the skin and the tissues immediately under it, occurring on the toes, the fingers, the ears, and the nose, and due to the injury inflicted upon the tissue in question by cold. The first symptom of which the patient is aware is an itchiness or burning sensation. Soon the affected part swells and takes on a dark red colour, the skin being stretched and shiny. A blister may form, and this may burst, an event to be avoided, because the vitality of a part affected with chilblains is so low that the process of healing is exceedingly long and difficult.

Chilblains may be prevented by wearing warm clothes and stockings; by taking regular exercise of a vigorous kind, such as brisk walking, and skating when possible; and by daily rubbing of the parts most likely to be affected. Shoes and gloves must be perfectly easy. It is better not to use a hot-water bottle in bed at night, but if one is used it should not be brought near to the feet. People who are prone to develop chilblains may derive benefit from taking cold-liver oil or cod-liver oil and malt during cold weather.

When chilblains threaten, the affected parts should be painted with the strong tincture of iodine, and the lactate of calcium may be taken in doses of 15 grains (5 grains for a child), thrice daily. Should the parts still remain hot and irritable, zinc ointment or an ointment of ichthyol, 30 per cent in soft paraffin, may be applied on lint. If the chilblains break, the ichthyol ointment may be continued, or a stimulating ointment such as the following may be used:

Birch tar	1 drachm
Zinc oxide powder	2½ drachms
Soft paraffin	5 drachms

A lotion of equal parts of hydrogen peroxide and warm water will make an excellent wash for the sores, especially if they are suppurating. *See* Ambrine; Frost Bite; Skin.

CHILD: ITS CARE AND ATTENTION

Useful Facts Concerning the Feeding and Management of Children

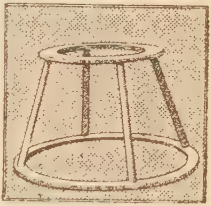
This article contains a mass of useful information designed to help and advise the mother in the upbringing and development of her children. See also Adenoids; Baby; Convulsions; Diet; Growth; Rickets; Teeth; etc.

Infancy may be said to merge into childhood about the time when the infant is cutting the milk teeth, say in the 7th or 8th month, though others make childhood begin at the end of the first year. It may be said to merge into youth about the 6th or 7th year, when the permanent teeth appear and when the more formal education generally begins; or childhood may be considered as lasting on till adolescence ushers in the characteristics of maturity.

Childhood is marked by active bodily and mental development. The height at birth should be doubled in the first six years, and at 14 years is eleven-twelfths of the individual's adult height.

The weight at the end of the sixth year is about double that at the end of the first year, and it doubles again at 14 years. Thus at six years a child will measure about 3 feet 6 inches and weigh about 3 stones, and at 14 the figures may be about 4 feet 9 inches and 6 stones respectively. A well-developed child walks as a rule at the end of the first year, or at any rate, at 15 months. Till about four years the gait is not very steady, however.

While strongly deprecating too much repression of childish activities, it is not intended that children should be uncontrolled. The more their activities can be engaged in wholesome games and occupations which interest them the better. When a child begins to walk its willingness to get about may have to be restrained. Heavy children may press too much on their legs, and in these cases a "baby walker," that is, a frame which allows the child to use its legs but takes some of the weight off, is often an advantage. Young children should not be taken long walks, otherwise the arches of the feet may be overstrained, and flat foot may develop.


CHILD. Baby "walker"

It is necessary to ensure that children get a sufficiency of sleep, and up to the age of four a child should be encouraged to take a sleep in the afternoon. The hours of sleep generally required at various ages are as follows: Four years, 13 hours; six years, 12 hours; eight to nine years, 11 hours; twelve to fifteen, 10 hours. Children vary, of course, as regards their need of sleep, but these figures afford some guidance. A good rule is to allow a child to sleep as long as it can; another is that a child should not be allowed to remain up late at night, but should be sent early to bed regularly.

A close watch should be kept on children when they are attending school. Overstrain may be indicated by irritability of temper and a loss of appetite. In these circumstances, sufficient time for sleep must be insisted upon, and it may be necessary to diminish the child's work or even to take it from school altogether for a time. Children at school should not be allowed to spend too long over homework. Too much of this is often allotted to a child who, if he is conscientious, either overworks or is made unhappy by his inability to accomplish the task.

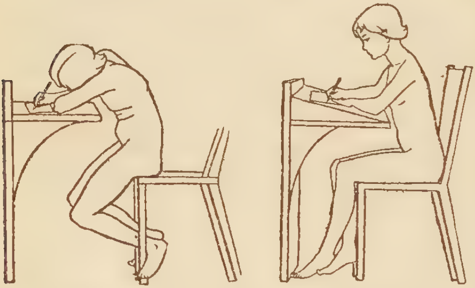
Attention must be paid to the posture assumed by children in school and at other times, as the habit of sitting or lounging with one shoulder higher than the other or with the shoulders stooped is a common cause of spinal curvature and certain other troubles.

A child should be brought up to enjoy the morning tub. When very young the water must, of course, be warm to tepid, but as they grow older they should wash in water from the tap.

They must have a brisk rub down with a towel afterwards. If it is observed that they do not react well, the tub should be discontinued, but it will be beneficial to wash the neck and shoulders with cold water. These measures help to harden the child against catarrhal troubles.

A child should be much in the open air and sunlight, and should have its bed-room window open at night. A draught can easily be kept from the child's bed. The importance of sunlight is emphasised by its ability to prevent and cure rickets and its beneficial effects in surgical tuberculosis ; and that of fresh air by its influence on consumption.

A close watch should be kept to see that a child is in the habit of breathing properly, and breathing exercises should be instituted if he does not do so. He ought to breathe deeply and through the nose. If he is a mouth-breather probably adenoids are present, and these will require to be dealt with before breathing exercises are undertaken. Clothing should be sufficiently warm. Children are often turned out in cold weather with bare feet and legs with a view to hardening them. Much trouble of the joints is caused in this way. On the other hand, some children are overweighted with clothes. Boots should be broad at the toes and have low heels.


CHILD. Harmful and correct sitting postures
Courtesy of the Ling Association

With regard to food, at one year a child is having bread and other carbo-hydrate foodstuffs in addition to milk. Three or four months later it may have butter on the bread, and in a month or two a thoroughly baked potato mashed with a little butter may be added to the midday meal. Crusts and rusks should be given for the child to exercise its teeth on. In the last quarter of the second year eggs are added to the diet, though a soft-boiled egg with breadcrumbs is often enough given earlier. The pulp of a baked apple may be given at the fourteenth or fifteenth month. Porridge with milk should be given regularly from the eighteenth month.

After the age of two to two and a half years, the child should be trained to take its food in three meals with only a little milk or soup before bedtime. Meat is added at the end of the third year, and is at first cut into small pieces. It is not necessary to give meat oftener than once a day, though it should be remembered that as children grow older they require a liberal allowance of meat, fish or eggs for the purpose of growth. The beverages at meals should be milk, cocoa and water; tea and coffee should be withheld till at any rate the tenth year.

Fresh fruit and vegetables should always be part of the diet, given in forms suited to the digestive powers. Pickles, condiments and foodstuffs of a highly seasoned nature should not be given to children.

From the beginning a child should be trained to swallow its food without the help of any beverage to wash it down. Food should not be allowed between meals; indulgence in this respect often enough ruins a child's digestion. The craving for sweets cannot be disregarded, but, if possible, these should be given with meals and not in any quantity before a meal. It should be remembered that the child's appetite for other food is impaired by indiscriminate consumption of sweets.

CHILDBIRTH: PRECAUTIONARY MEASURES

Some Practical Knowledge for the Expectant Mother

Below are given some valuable hints which will assist the mother both before and after the event. Nurses and midwives, too, will value the information which this article contains. See also Pregnancy

As soon as a woman knows that she is pregnant she should engage a doctor and nurse and begin making other preparations for her confinement. When this is imminent the room in which it will take place should be prepared. Although childbirth differs usually from a surgical operation in that it is a natural physiological process, it resembles the latter in exposing the patient to the risk of infection with microbes. This fact must always be kept in mind in the preparation of the room, and in all handling of the patient during labour and subsequently.

If there is any choice in the matter, a large quiet room should be selected. The lying-in room should always have a fireplace. The carpet should be taken up and beaten, the floor and woodwork should be thoroughly washed with soap and water, and the walls gone over with a damp cloth. There should be no superfluous furniture in the room, and the hangings should be few, washable and clean. The bedstead should be plain and clean. It should be placed so as to afford easy access from either side. It should have a spring mattress and hair mattress. Any tendency to sag should be prevented by placing boards across the frame. A waterproof sheet should be placed on the hair mattress or, if this is not available, several sheets of clean brown paper. Over this is put a blanket and then a sheet. The patient lies on a waterproof sheet covered by a draw sheet, made of a sheet folded to the width of a yard; or in place of this a large sheet of gamgee may be used.

During labour the nightdress should be well tucked up to keep it clean, and a flannel or cotton petticoat should be worn. The advantage of this is that it avoids the necessity of changing the nightdress when the labour is over and the patient very tired. An ample supply of sanitary napkins should be available. The practice of keeping soiled sheets or clothing beneath the bed is thoroughly bad.

Labour takes place in three stages. In the first the womb is opening up to allow of the passage of the child; in the second the child is being expelled; and in the third the afterbirth comes away. The whole process takes about sixteen hours in the case of a first baby, though it may be much longer. It may be shorter, and generally is so at subsequent confinements.

The first stage is much the longest, and is marked by regularly recurring pains which increase in frequency and severity. The pain is felt first in the back and passes thence to the front of the body. These pains are characterised by their beginning in the back and by a discharge of blood-stained mucus, "the show," which accompanies them. If the patient walks about during this stage it helps to hasten the labour, but she must avoid tiring or chilling herself.

The second stage brings a difference in the character of the pains; they are more grinding in character and the patient tends to "bear down." She should now be in bed and should not get out of bed for the relief of the bladder or bowels, but should use a bed pan. The neglect of this precaution has frequently led to the baby being born in circumstances which were awkward or dangerous for it. It may be said here that when the bowels move during or after labour the nurse in performing the toilet of the bowel should always wipe backwards, in order to avoid carrying infected matter towards the vagina, and should have some lysol in the water which she uses for the purpose. The nurse should have her hands scrupulously clean before changing diapers or washing the parts; she should use hot water and soap with a nail brush, and should then soak the hands for a little in lysol solution, a teaspoonful to the pint.

When labour appears to have begun the doctor should be summoned. If labour is precipitate and it seems likely that the baby will be born before his arrival, the situation should be accepted with calmness. The patient should be made to lie on her left side, with the thighs bent and a pillow between the knees. She should be encouraged to cry out with her pains, as this will tend to diminish their force, and may prevent tearing of the passages.

When the child's head is born, it should be supported until the body is expelled, and meanwhile with a clean rag mucus may be cleaned off the mouth and nostrils. If the child is born with membrane over its face this should be cleared off, and if, as sometimes happens, it is born within the membranes these must be ruptured at once, or the child will be suffocated or drowned. If it should happen that the baby is born when the mother is standing, an instant examination should be made as to whether the umbilical cord has been torn, and, if so, it should be tied about 2 inches from the infant's belly with a piece of tape or some strands of linen thread.

As soon as a child is born, after one or two gasping breaths, it usually cries lustily and vigorous breathing is established. If there is any delay in starting breathing, a smart smack on the buttock or sprinkling cold water on the face and chest may prove a sufficient stimulus. When the cord has been tied and divided, the baby is wrapped in a warm flannel, care being taken to allow a sufficient air supply, and is placed near the fire. Details to be observed in giving the infant its first bath will be found under the heading Baby.

In the absence of the doctor, the nurse, standing on the mother's right side, should place her left hand on the patient's abdomen over the womb. This will be felt as a more or less distinct lump, upon which she will exercise gentle pressure. On no account should any attempt be made to hasten the expulsion of the afterbirth by pulling on the cord. When the afterbirth comes away the nurse will still keep up gentle pressure on the womb for a short time. Care should be taken not to expose the mother more than is necessary. If she feels chilly a hot diaper may be applied and a hot-water bottle may be placed at her feet.

After the expulsion of the afterbirth, attention is given to any injuries which the mother's parts may have received. She is then washed and made comfortable. Some doctors apply a binder, others do not. When labour is over the room should be darkened and the mother encouraged to sleep. When she has rested sufficiently, the baby is put to the breast.

It may be useful to state here the more necessary articles to be procured in anticipation of a confinement. One, preferably two, mackintosh or waterproof sheets; draw-sheets; at least three abdominal binders for the mother; two or three dozen sanitary napkins of the largest size; one or two pounds of absorbent cotton wool; some stout linen thread cut into lengths of about 10 inches, or strong narrow tape, for tying the umbilical cord; a bottle of lysol; large and small safety pins; a clean nail brush; antiseptic dusting powder; a pot of vaseline; clean scissors; and two basins.

Three or four lengths of the linen thread are tied together at each end to form a ligature, and two such are required. Before being used they should be boiled for half an hour, or in an emergency put in lysol solution. Lint and other dressings may be baked in a hot oven for half an hour, care being taken not to scorch them. This is best accomplished by placing them in a hot oven with a dying fire. Abdominal binders, towels, sheets, etc., should be freshly laundered and put away. The scissors should be left in lysol solution some time before being used to cut the cord. Bed pans should be rubbed over with lysol solution before use, and after use should be cleaned at once and rubbed over with lysol before being put away.

CHILL. A sensation of coldness, especially in the back, and attended by shivering, is spoken of as a chill. This may be followed by other symptoms of a common cold, but it may usher in influenza, pneumonia, or another acute disease. Chills are usual in malaria. The patient should be put to bed between blankets, with hot-water bottles at the feet and sides, and should be given hot drinks. It is often well to begin the treatment for a chill by giving a very hot mustard foot-bath. *See* Cold, Common.

CHILLI PASTE. *See* Capsicum.

CHLORAL. When reference is made to chloral, what is meant is chloral hydrate. It has long been regarded as an efficient hypnotic, as it quickly produces natural sleep from which one wakes properly refreshed. Like other similar drugs, it has, however, its dangers. If given in large doses it depresses the heart and respiration, and moderate doses may be dangerous to those who have fatty hearts or diseased blood vessels. It tends to lose its power if taken often, and, what is more, it develops a craving for itself.

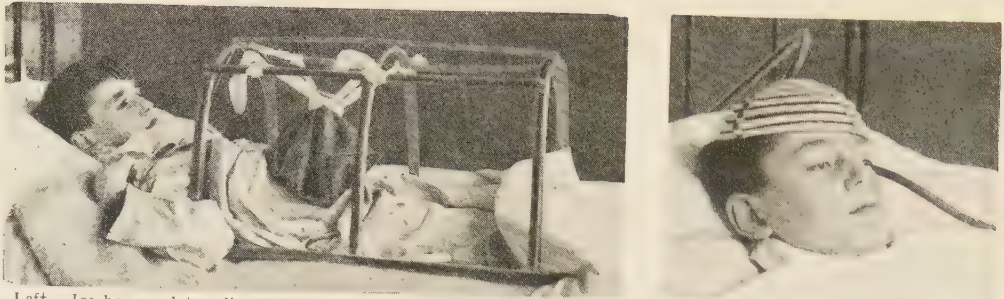
Chloral hydrate is given in doses of 5 to 20 grains, though 10 grains is usually sufficient. It may also be given as the syrup of chloral hydrate, dose ½ to 2 drachms. Other conditions in which the drug is given include convulsions in children and sea-sickness.

Camphorated chloral B.P.C. is a useful preparation for rubbing over tender spots in neuralgia, or chloral menthol, which is similar, may be used.

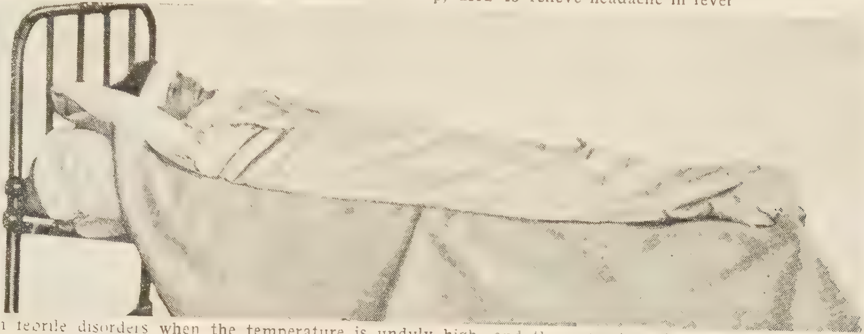
Derived from chloral, chloralamide acts also as a hypnotic and is safer.

POISONING BY CHLORAL HYDRATE. Poisoning from an overdose of chloral hydrate is treated by giving an emetic and keeping the patient warm in bed with blankets and hot-water bottles. He should be roused and kept from going to sleep again, by slapping his chest with damp towels if necessary. Whisky, sal volatile and hot coffee are used as stimulants ; if the patient has become unconscious, a pint of warm coffee may be injected into the bowel.

CHLORIDE OF LIME. By exposing slaked lime to the action of chlorine gas, a substance is obtained which is known as bleaching powder, chloride of lime or chlorinated lime. It acts as an antiseptic, disinfectant and deodoriser. For the latter two

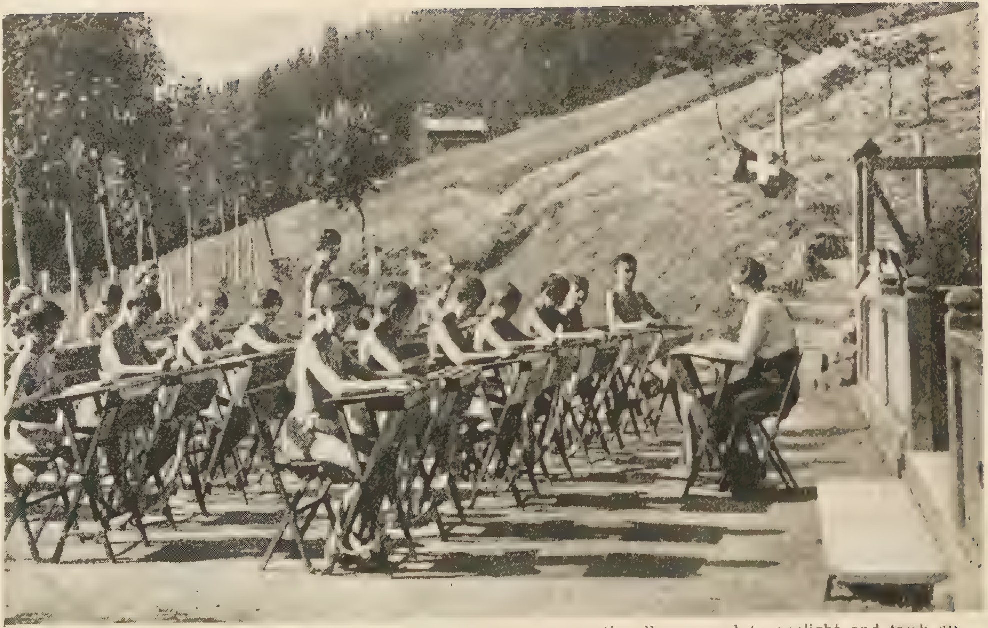


Left. Ice bag used to relieve abdominal pain. By suspending it from a bed cradle pressure is avoided. Right. Leiter's tubes, in the form of a cap, used to relieve headache in fever



In febrile disorders when the temperature is unduly high, and the patient restless and irritable, relief may be afforded by a cold pack. The above picture shows a patient wrapped in a wet sheet

COLD PACKS: THEIR USE IN REDUCING TEMPERATURE AND EASING PAIN

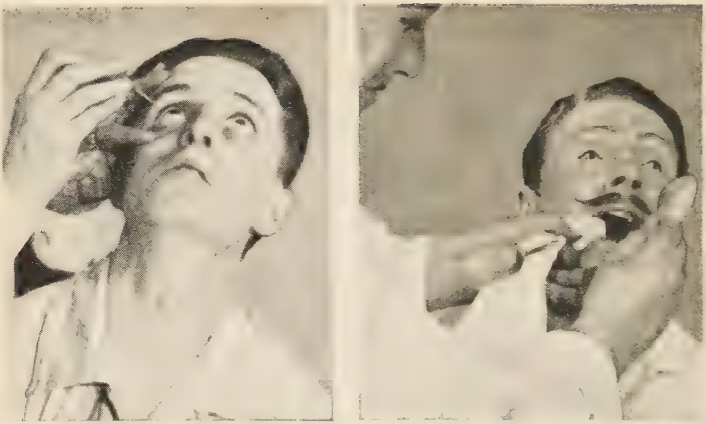


Fighting consumption at Leysin, where young patients are continually exposed to sunlight and fresh air

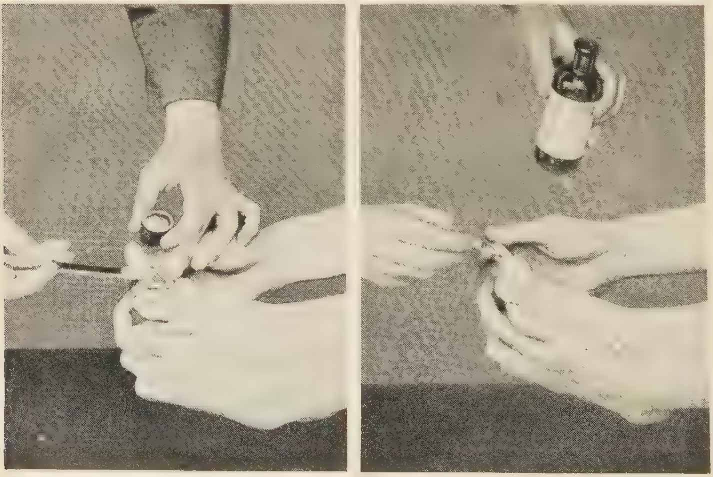
SUNLIGHT AND FRESH AIR : TWO MAIN FACTORS IN THE CURE OF CONSUMPTION

Left. Outdoor sleeping shelter for patient unable to take sanatorium treatment. Right. A bed patient must be kept suitably occupied during the daytime and not allowed to sleep

HINTS ON THE TREATMENT OF A CONSUMPTIVE PATIENT



Left. Conjunctivitis. Drugs are applied to the inflamed membrane by a dropper, the patient looking up while the lower lid is drawn down. Right. Choking. The jaws are kept apart by the handle of one spoon and the obstruction is raked forward with the handle of another



Left. Corn. Treatment of the soft variety. A plaster is placed round the corn and its cavity filled with powdered salicylic acid. Right. Plaster and contained salicylic powder are then covered with collodion

HOW TO TREAT CONJUNCTIVITIS, CHOKING AND CORNS

purposes it is frequently used in drains and privies. Clothing may be disinfected by soaking for 24 hours in water containing 2 ounces of chloride of lime to the gallon. By dissolving washing soda, with chloride of lime, in water, the solution of chlorinated soda is obtained, of which 2 tablespoonsful in 1 to 3 pints of water make a good antiseptic lotion. The weak solution can be used as a mouth wash. Eusol, Dakin's hypochlorite solution and similar preparations are made from chloride of lime and boracic acid, and are used as antiseptics. *See* Disinfection.

CHLORODYNE. This name is given to a proprietary medicine used for relieving pain and promoting sleep. The compound tincture of chloroform and morphine is a similar preparation, and is given in doses of 5 to 15 minims. This is a very efficient remedy for many kinds of pain, and especially for colic. Another use for it is to allay a persistent dry cough.

The mixture is a very dangerous one to use for infants and children, and should not, indeed, be used by anyone except on the advice of a doctor. An overdose produces the symptoms of opium poisoning, and the treatment is the same. *See* Opium; Poisoning.

CHLOROFORM. For the production of prolonged general anaesthesia chloroform or ether are the drugs employed, either singly or in combination with each other or with other drugs. Chloroform has the advantages of being more readily portable, of having a more agreeable odour than ether, and of acting more promptly. As used at childbirth, it is a safe and valuable means of relieving the pangs of labour.

Chloroform is a colourless volatile liquid with a sweet pungent taste. It may be used to flavour mixtures and to exert a carminative effect, in the form of chloroform water or of the spirit of chloroform, the dose of the latter being 5 to 20 minims for repeated doses and 30 to 40 minims for a single dose. The compound tincture of chloroform and morphine, dose 5 to 15 minims, acts as an anodyne. Liniment of chloroform may be applied in muscular rheumatism or in neuralgia. It reddens the skin and relieves pain. It is a constituent of the A.B.C. liniment (q.v.), in which form it it generally used. *See* Anaesthetic; Chlorodyne.

CHLOROSIS. *See* Anaemia.

CHOKING. There is a form of choking which is due to nervous disease affecting the functions of the muscles which open and shut the larynx. Choking may also be due to disease of the larynx. But the form of choking now to be considered is due to the presence of a foreign body in the upper part of the air passages.

When this is a piece of meat or of bone, or something similar, the finger, or the handle of a spoon, should be passed to the back of the throat and the foreign body should be hooked forward. It is often a useful procedure to hold a child up by the feet and smack it once or twice between the shoulders. This should never be done, however, if there is any suspicion that the foreign body is in the windpipe. If, when the throat is clean, breathing is found to have ceased, artificial respiration (q.v.) should be started at once. *See* Asphyxia; Probang.

CHOLERA. Asiatic cholera, which at one time occurred periodically in Great Britain in epidemics, is now all but unknown, largely in consequence of the improved water supply of towns and especially of seaports. Cholera is due to a microbe, and gets into the body in drinking-water or in food which has been contaminated by infected water, for example, milk or salads.

Symptoms come on suddenly and severe diarrhoea is the chief of these. The motions of the bowels are profuse and watery, and from their appearance are sometimes spoken of as rice-water stools. Early and energetic medical treatment is necessary. Potassium permanganate is given in solution by the mouth and solutions of saline are injected into the tissues or veins. The patient should drink freely.

When cholera is prevalent all water used either for drinking or for washing food utensils should be boiled. Milk should also be boiled, and ice cream, salads and raw fruit, unless in perfect condition, should be eschewed. Before taking food the hands should be washed, and those in attendance on cases of the disease should also soak their hands in an antiseptic solution. Any tendency to diarrhoea should be arrested, a useful remedy being a tablespoonful of castor oil with 15 drops of laudanum.

INFANTILE CHOLERA. The summer complaint of infants, or infantile cholera, is a very fatal form of diarrhoea which affects young children, principally those under two years of age. It occurs during hot weather, and is especially prevalent amongst hand-fed babies who live in dirty and insanitary surroundings. Infection reaches them through milk, and is either present when the milk is received from the dairy, or is introduced subsequently by dust, flies, or dirty utensils.

Milk should be received in sealed bottles. It should be kept in a cool, clean spot in the house, and should be constantly covered. It should be sterilised, and bottles and teats, after being thoroughly washed, should be boiled before being again used. A dummy teat is a danger.

Should the disease occur, vomiting may be free, and the motions of the bowels are frequent, profuse, and watery. The face is pinched, and the belly feels hard and inelastic. The temperature is likely to be high. A doctor should be procured at once, and meanwhile the child may be put in a pack. A towel or piece of sheeting is wrung out of cold water and put round the body from the armpits to the feet. Over this a blanket is wrapped. Boiled water is all that is given till vomiting has ceased, when albumen water and whey may be given. Should the child show signs of collapse, that is, coldness, blueness and prostration, carefully protected hot-water bottles should be put round it, and small quantities of weak spirits given from time to time.

Soiled napkins should be placed in a solution of carbolic acid (1 in 20), or of lysol, before being washed. This precaution is very necessary, as flies may carry infection from soiled napkins to milk, and other children may be infected. *See* Diarrhoea; Normal Saline Solution.

CHOREA. *See* St. Vitus's Dance.

CINNAMON. The bark of the cinnamon tree contains a volatile oil, to which it owes its characteristic taste and smell. It is this which makes powdered cinnamon a useful condiment and aid to digestion. It relieves flatulence, and for this purpose either tablespoonful doses of cinnamon water or the compound cinnamon powder, in doses of 10 to 40 grains, may be taken.

Cinnamon oil is given in doses of ½ to 3 minims, and may be conveniently taken on a lump of sugar. It may stop a common cold if taken early enough and frequently, and is also used in influenza. Applied to the cavity of a painful tooth, the oil acts as an anodyne. *See* Cold, Common; Oil.

CIRCULATION OF THE BLOOD

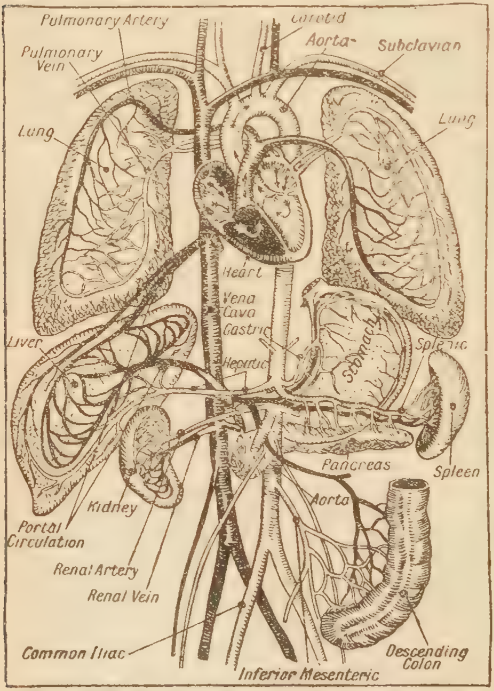
How the Many Organs of the Body are Nourished

In the following article the writer explains in a concise and simple manner the way in which oxygen is supplied and waste products are expelled by the blood stream, and other interesting facts. See Artery, Heart; Vein, etc.

In the functioning of the human body the blood circulates continuously through a series of closed tubes, the arteries, capillaries and veins, in two circles, the heart being the starting point in each case. In the first or systemic circulation the blood is sent from the heart throughout the body, carrying food and oxygen to every organ and tissue and taking away their waste products, and in the second or pulmonary circulation the blood is sent from the heart through the lungs, where it gets rid of carbonic acid gas and receives oxygen.

In the first it is the left side of the heart, and in the second the right side, which pumps the blood onwards. From the head, trunk and limbs the blood finds its way through the veins to the right upper chamber (right auricle) of the heart. When the heart beats, the walls of this chamber contract, forcing the blood through a valve into the right lower chamber or right ventricle. The ventricle has thick muscular walls, and, when these in their turn contract, the blood is forced through the pulmonary artery and reaches an immense network of thin-walled little vessels, threaded amongst the air cells of the lungs.

Through the walls of these capillaries there is an interchange of gases between the blood and the air in the air cells of the lungs, carbonic acid passing out of the blood and oxygen passing in. The purified blood is collected into the pulmonary veins and carried to the left upper chamber of the heart (left auricle). Here, again, at the start of the heart beat, the blood passes through another valve, flowing into the left lower chamber or left ventricle of the heart. The walls of this chamber are very thick, and when they contract, the blood is forced into the main distributing artery, the aorta, and reaches every portion of the body.

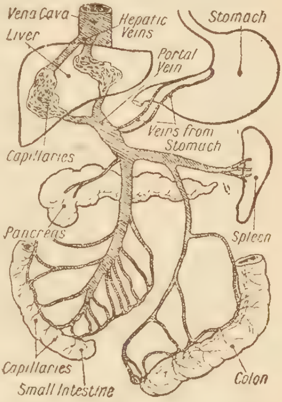

Pulmonary Artery
Carotid
Aorta
Subclavian
Pulmonary Vein
Lung
Lung
Heart
Vena Cava
Gastric
Liver
Hepatic
Stomach
Splenic
Pancreas
Spleen
Aorta
Kidney
Portal Circulation
Renal Artery
Renal Vein
Common Iliac
Descending Colon
Inferior Mesenteric

CIRCULATION. Vessels carrying impure blood for cleansing, e.g. the pulmonary arteries running from heart to lung, are shown darker than those carrying pure blood to feed the tissues

The farther it goes from the heart, the smaller become the branches of the arteries through which it passes, until finally it enters the minute capillaries. From the capillaries it passes into the veins, which progressively increase in size, and finally empty their contents into the right auricle of the heart, from which we have seen it start out in its course.

While the blood is in the capillaries of the body a free interchange takes place between the blood within them and the fluid which bathes the cells of the body, food and oxygen passing out of the blood and waste products passing in. It should be observed however, that the blood which leaves a large number of glands, amongst them being the pancreas, the supra-renals, the thyroid and the pituitary, in addition to waste products, contains contributions from these glands, known as internal secretions, which are of the greatest importance in the bodily economy.

A third circulation may be described, namely, the portal circulation. The blood coming from the walls of the stomach and intestines, where it has absorbed the products of digestion, etc., and from the spleen, is carried by the portal vein to the liver. Here it passes again through capillaries, giving up to the liver cells certain of its constituents, and being collected again into a large vein which carries it to the right auricle of the heart.



CIRCULATION. Portal vein that carries products of digestion to liver

It is essential to the maintenance of a sufficient blood pressure to carry on the circulation efficiently that the calibre of the medium sized arteries should be kept sufficiently small. The calibre of the arteries is regulated by the circular muscle fibres contained in their walls, and these are controlled by the vaso-motor nerves (q.v.).

From the above it is clear that the circulation will be impaired when the heart is weakened by disease, and when, owing to defective control of the vaso-motor nerves, the blood vessels do not remain sufficiently tight to keep up blood pressure. The latter contingency occurs in neurasthenia and in other conditions, and is responsible for cold hands, shortness of breath, and other symptoms. Such a condition may also be limited to particular parts, as in Raynaud's Disease.

CIRCUMCISION. The removal of the foreskin, which constitutes the operation of circumcision, ought always to be performed in infancy when the part is long and cannot be retracted easily and thoroughly. It is a small operation and can be performed at home. If a tight foreskin is neglected, the secretions of the glands become foul and irritating, and there is difficulty in passing water, which leads to straining. Some of the consequences of neglect are bed-wetting, various nervous disorders and rupture. *See* Phimosis.

CIRRHOSIS. The replacement of the normal tissues of an organ by fibrous tissue is known as cirrhosis. The affected organ becomes hard and its power to carry on its functions is impaired to a degree corresponding with the extent of the replacement. The process may be observed in the liver, the kidney, the heart, the spleen and elsewhere in the body. The name is derived from a Greek word having reference to the yellowish colour of a liver so effected. *See* Bright's Disease ; Fibrosis ; Heart ; Liver.

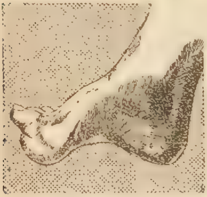
CITRIC ACID. The juices of oranges, limes and lemons owe their tartness to citric acid, which is obtained from them in colourless crystals. The dose of the acid is 5 to 20 grains and it is used to provide cooling drinks which are agreeable at any time, but specially so during fever. The acid may be used to make an effervescing drink, and this is often useful when the stomach is acutely irritated. It may be made by dissolving 20 grains of citric acid and 30 grains of bicarbonate of potash, each in half a glass of water, and then mixing the two in a large tumbler. It is drunk while effervescing.

The acid is used to form certain salts which have various uses in medicine, such as magnesium citrate, citrate of iron and quinine and sodium citrate. The last is often used in the strength of 1 grain to the ounce to render milk more digestible for an infant, which it does by producing a softer and looser curd in the infant's stomach. Citric acid is much used in making Imperial drink and home-made lemonade. *See* Beverages.

CLAUSTROPHOBIA. The uneasiness and apprehension often manifested by the victims of neurasthenia when in rooms or other closed spaces is known as claustrophobia. Sometimes there is a dread of open spaces, and this is called agoraphobia. *See* Neurosis; Phobia; Psycho-therapy.

CLAVICLE. *See* Collar Bone.

CLAW FOOT. When the natural arch of the foot is exaggerated, the toes drawn backwards towards the instep, and the foot consequently shortened, the condition is described as claw foot or pes cavus. This may begin at an early age and although the appearance of the foot may not suggest it, it will be a suspicious circumstance if the child is rather awkward in running about and shows an unusual readiness to stumble. The suspicion will be confirmed if on attempting to bend up the foot towards the leg it is found that the angle in front of the ankle cannot be made less than a right angle, which ought to be possible for the normal foot.


CLAW FOOT: exaggerated arch of the instep

At this stage an attempt may be made to rectify the condition by trying to bend up the foot several times each day. The boots worn should be sufficiently long, and it is recommended that a leather bar, half an inch in thickness, should be fixed across the sole of the boot beneath the tread in order to throw the fore part of the foot up. If this does not suffice, it is necessary to divide the Achilles tendon (q.v.) and in worse degrees, other structures also. *See* Foot.

CLEFT PALATE. Some children are born with a cleft or gap along the middle of the arch of the mouth, which may be limited to the soft palate or extend forwards to the hard or bony palate. It is often accompanied by hare-lip.

A baby which has a badly cleft palate cannot suck. When it attempts to swallow, much of its food passes through the cleft, and reappears at the nostrils; this, of course, is very serious. Such a child has to be fed very carefully. Again, a child with cleft palate is much more liable than another to suffer from all sorts of inflammation of the throat, mouth and nose. Lastly, speech is very difficult to produce, and even more difficult to understand.

The treatment of cleft palate consists of a surgical operation, which may be performed between the third and sixth months, though some surgeons prefer to wait until between the second and third years. It essentially consists of loosening the membrane which covers the bony part of the palate on each side, and bringing the two portions of membrane together, so that they can be joined in the middle line. *See* Hare-lip; Mouth; Palate.

CLERGYMAN'S THROAT. A chronic inflammation of the structures at the back of the throat is sometimes called clergyman's sore throat on account of its being caused to a large extent by an over use or improper use of the voice. The mucous membrane lining the back of the throat is dotted with little dark red elevations. A dry cough and a tendency to hawking, which are important symptoms, aggravate the irritation, and the voice becomes weak and husky.

General treatment of some kind is usually necessary, and dyspepsia, constipation, anaemia, etc., should be remedied, if they exist. If there is any obstruction to nasal breathing it must be rectified. The granules at the back of the throat should be destroyed by the galvano-cautery or in some other way. The voice must be rested for as long as may be necessary. Alcohol, tobacco, and condiments should be avoided. As a temporary measure, the B.P. lozenge of benzoic acid, krameria or of red gum, or similar preparations, may be used. *See* Larynx; Pharynx.

CLIMACTERIC. *See* Change of Life.

CLOT. *See* Coagulation.

CLOTHING. From the hygienic point of view, clothes are worn to afford protection against heat, cold, damp, wind and mechanical or other injuries. In hot climates, for instance, one must guard against the injurious rays in the strong sunlight, and also against the bites of such insects as the mosquito, which are capable of conveying disease infection. The body loses heat by radiation, conduction, and by the evaporation of sweat. In cold climates the clothing should therefore conduct heat badly, so as to retain it within the body, while in a hot climate the reverse is the case,

There is always a danger of chill if the clothing becomes damp with sweat, and to prevent this the clothing must absorb moisture well. Wool is a bad conductor of heat and is a good absorbent, and should be chosen for purposes of warmth, though silk, which also fulfils these requirements, may be preferred by those who can afford it. Cotton and linen, on the other hand, are good conductors of heat, and may be chosen for coolness, but as they do not absorb moisture well, they tend to become unpleasantly clammy, and if one stands about after perspiring freely, a chill is likely to result. It is safer, even in hot weather, to have thin woollen or silk under-garments.

Air is a bad conductor of heat and it is for this reason that fabrics which are loosely woven, and, therefore, have much air in their interstices, are warmer than those which have a dense texture. From this point of view cellular cotton is warmer than any other sort and may be warmer than some kinds of flannel. Also, several layers of thin clothing are warmer than a single thick layer, owing to the air between the layers.

The colour of the outer clothing is of some importance. Dark colours, such as black and dark blue, absorb heat, while lighter colours, for example, light grey and white, do this only slightly or not at all. Therefore black garments, by absorbing the heat of the sun, may be oppressive in the summer.

Many people believe that by exposing the limbs of their children to all weathers, the children will be enabled better to withstand cold. This is a great mistake, and is the cause of much chest and joint trouble. All clothing should be loose enough to permit of the free play of the trunk and limb muscles. Young girls should not wear corsets as they tend to interfere with the development of the muscles of the spine. If they are allowed free, open-air exercise like their brothers, the need for corsets will probably never arise. If a corset must be worn, it should support the breasts without compressing them. Garters and other constricting bands about the clothing are harmful. Varicose veins are often due to constricting the legs with garters, and these should be replaced by suspenders. As far as possible all clothing should be hung from the shoulders.

Baldness in men has been attributed, and probably correctly, to wearing tight and badly ventilated hats. The tight brim certainly interferes with the circulation of blood in the scalp, and the moist warmth favours the growth of organisms.

Badly shaped boots are responsible for much suffering and disablement. A pointed toe on a boot is wrong, as it forces the great toe out of position and crowds all the toes together. Such a boot is modelled as if the axis of the foot ran down its middle, whereas in the normal foot the inner surface of the great toe and of the heel are in line. In trying on a boot its fitness should be tested by standing up with it on, as in this position the foot always lengthens and broadens to some extent. A woman who walks on a high and narrow heel places her foot in an unnatural and unstable position. She therefore tires easily and is liable to sprain her ankle from trifling causes.

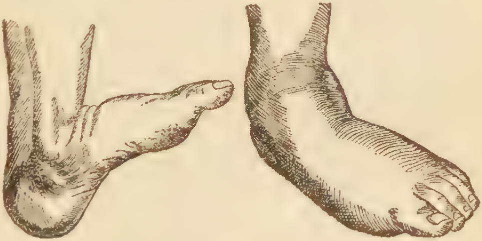
Gloves should be sufficiently large to allow a proper circulation of blood in the fingers, or chilblains and chapping result.

CLOVE. Cloves, which are dried buds of an Eastern plant, eugenia caryophyllata, have important uses in medicine and in cooking. They owe their properties to a volatile aromatic oil which they contain. Applied outwardly, oil of cloves produces heat and redness of the skin, and may relieve muscular and other pain.

For internal use, oil of cloves may be given in doses of ½ to 3 minims, and may be taken on a piece of lump sugar. By stimulaing the flow of saliva and of gastric juice and increasing the movements of the stomach, it improves appetite and digestion. It is often prescribed in indigestion with flatulence. Oil of cloves also stimulates the movements of the muscles in the walls of the intestine and prevents irregular and colicky contractions.

CLUB FOOT. One or both feet may be deformed at birth, or may subsequently become so, as a result of paralysis of the muscles which move the foot, or from contraction of scar tissue following on disease or injury.

There are four main varieties of club foot. In the first, or talipes equinus, the heel does not reach the ground, the weight of the body falling on the ball of the foot. The opposite condition is found in talipes calcaneus, where the front of the foot is raised and the weight is taken on the heel. In talipes valgus and talipes varus the patient walks on the inner or outer border of the foot, respectively. Frequently the deformity consists of a combination of two of these types, that known as talipes equino-varus being the commonest.



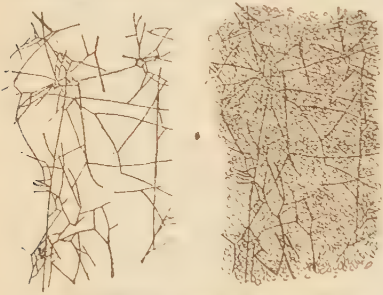
CLUB FOOT. Left, variety termed talipes calcaneus **right,** talipes valgus, extreme flat foot

In congenital cases, the mother or nurse may correct the deformity by manipulating the foot into the correct position several times a day. Such treatment, to be of any use, must be begun in the early weeks of life. Some form of apparatus must be applied to keep or bring the foot in a correct position. In other cases tendons and other structures have to be divided, and it may be also necessary to remove wedges of bone. *See* Flat Foot; Foot.

COAGULATION. Through the action of certain agents, such fluids as blood, milk and white of egg are clotted or coagulated, that is to say, they assume a more or less solid state.

The coagulation of milk is usually brought about by the ferment, rennet. In the presence of salts of lime, this ferment converts caseinogen, a protein solution of milk, into the curd, which consists of casein and entangled fat. This process is a necessary preliminary to the digestion of milk and to the manufacture of cheese.

Blood coagulates when it is shed, the process usually beginning in from two to three minutes on the surface of the blood, which becomes stiff and jelly-like. In a short time the clot begins to shrink and, in doing so, squeezes out a straw-coloured fluid, known as the blood serum. The clot consists of a meshwork of fibrin filaments, imprisoning red and white blood corpuscles. The fibrin is produced from a substance known as fibrinogen, which is in solution in the blood plasma, the liquid part of blood. The change is brought about by the action of fibrin ferment, or thrombin.



COAGULATION. Left, network of fibrin threads shown on right filled with red blood cells

The coagulation of blood is an important factor in the natural arrest of bleeding, as the clot which is formed blocks, more or less effectually, the opening of the cut blood vessel. It may be readily understood, therefore, that wounds must be handled very carefully as, in cleansing them, clots may easily be washed or rubbed away from the ends of the blood vessels, when bleeding will start afresh.

A thrombus is a clot which forms in the heart or blood vessels during life; the process is called thrombosis. The expression "a clot of blood on the brain" may be taken to mean that clotting has taken place in a brain artery or that such an artery is blocked by a piece of thrombus detached from elsewhere. *See* Bleeder; Bleeding; Blood; Blood Vessel; Embolism; Milk; Protein; Thrombosis.

COAL GAS POISONING. *See* Carbon Monoxide.

COCAINE. The alkaloid cocaine is obtained from the leaves of the coca plant, which is found in South America, and which, it must be observed, has no connexion with cocoa.

It is largely used to produce local anaesthesia, and is of great value in the performance of operations on the eye, the nose and throat, and for tooth extraction. Sea-sickness and the vomiting of pregnancy are amongst other conditions which may be benefited by its use.

It is not a drug which can safely be taken often, as a habit is quickly formed. The victim of cocainism, as the habit is called, rapidly loses all his moral sense; he usually suffers from sleeplessness, and may become clearly insane; his circulation, digestion and vision suffer greatly, the appetite is generally interfered with, and his body wastes. An overdose of cocaine first excites and then depresses the brain, there is difficulty of breathing, and possibly convulsions. The treatment is to administer strong tea and coffee, sal volatile, and other stimulants.

Eucaine, stovaine, butyn and other substances have been introduced at various times as substitutes for cocaine. The drug is one of those dealt with by the Dangerous Drugs Act. *See* Drug Habits.

COD-LIVER OIL. The value of cod-liver oil lies not only in the fact that it is a food and that, compared with other fats, it is very readily absorbed, but that it appears to have a powerfully stimulating effect on the general metabolism of the body. This is mainly due to its containing a plentiful supply of fat-soluble vitamins A and D. It is invaluable in rickets, in convalescence from acute diseases, in starvation, for people whose health is generally run down, as the saying is, for those constantly suffering from low spirits, in chronic diseases of the joints, and in chronic bronchitis ; it is pre-eminently serviceable in every variety of tuberculosis.

The dose of cod-liver oil is generally stated to be from one to four teaspoonsful, but more can be taken if it is well digested. It should always be taken after a meal or at bedtime, and, when beginning a course of the oil, the first doses should be small. If the plain oil is taken the taste may be improved by adding a little pepper and salt or ketchup, or by taking it in milk or coffee. Most people find it easier to take an emulsion or a mixture of cod-liver oil and malt extract.

When there is great difficulty in taking the drug internally it may be rubbed into the skin. In a child a good site for this inunction is the abdomen.

COFFEE. The stimulating effects of coffee are due to it containing the alkaloid, caffeine, which is identical with theine, the active principle of tea. Coffee is a true stimulant, that is to say, it stimulates without producing subsequent depression, as occurs, for example, after the use of alcohol. It quickens the mental faculties and removes drowsiness, it temporarily increases the power of muscular endurance, it stimulates the heart, the kidneys, the bowels and the skin.

Its habitual use to stave off sleep to permit of brain work at night is dangerous, as it may lead to nervous exhaustion. Muscular fatigue may be relieved or prevented, but, here again, it should not be used to allow of excessive strain. Coffee will be found to be a useful stimulant in heart disease and in prolonged fevers, such as pneumonia and enteric fever. In these cases also it affords a change of flavour for a patient on whom the monotony of milk diet is beginning to pall ; and this is a matter of considerable importance. Coffee with breakfast is often an aid in securing a regular action of the bowels. Strong coffee may relieve a paroxysm of asthma. It may be used as a stimulant for the depression resulting from injuries, snake and insect bites, etc. It is an antidote in narcotic poisoning, and, if the patient is unconscious, a pint of strong, warm coffee may be injected into the bowel.

If coffee is drunk to excess it may cause indigestion, sleeplessness and various nervous symptoms. *See* Caffeine; Tea.

COLCHICUM. Preparations of this drug have a remarkable power of relieving the most painful symptoms of gout, but they do not have any power in preventing the occurrence of gout, and do not affect its cause; they must only be looked upon as a mere means of relief. The commonest mode of administration is in the form of colchicum wine which is made with sherry. The active principle of the drug is colchicine. *See* Gout.

COLD. The direct effects of cold in producing disease are seen in chilblains, frost bite, and some forms of rheumatism; indirectly it acts by lowering the resistance of the body and allowing scope for microbes. Cold may thus cause bronchitis, pneumonia, and a large number of other ailments. The effects of cold in causing disease are increased if it is combined with dampness; and a draught of cold air is more dangerous than still air at a much lower temperature.

As a remedy, cold is chiefly used in arresting bleeding, limiting inflammation and fever, and in relieving pain. Very cold water hastens coagulation of the blood and so helps to arrest bleeding. It arrests bleeding into the tissues, and relieves pain in sprains and other injuries. Iced cloths are applied, or what is known as an evaporating lotion. But cold should not be long continued for such purposes in the aged or infirm, or the tissues may possibly die. An evaporating lotion or an ice-bag is often used to relieve neuralgia, and the latter also relieves the pain of pleurisy or of appendicitis and similar abdominal conditions. As the weight of an ice-bag might increase the pain, the bag is slung from a bed cradle.

For the reduction of fever, cold may be applied by cold sponging, by a cold pack or a cold bath. Delirium and headache in fevers and in brain diseases may be diminished by applying cold to the head, either in some of the forms already mentioned or by the apparatus known as Leiter's tubes. *See* Baths; Bleeding; Cold Pack; Fever; Frost Bite; Leiter's Tubes.

COLD. A common cold or, as it is technically named, coryza, is an acute infectious disorder due to a micro-organism which has not yet been definitely identified, though there is good evidence to implicate the micrococcus catarrhalis. There is a great difference in the liability of different people to colds, some scarcely ever being affected, while others have a succession of them every winter.

Liability to infection does not appear to be diminished at all by vigorous general health; it is much increased by close contact with those suffering from colds, especially in rooms or other confined spaces; and the infection is widely disseminated by coughing and sneezing. A special tendency to take cold may depend on sources of irritation in the nose and throat, for example, enlarged tonsils or chronic irritation due to the excessive use of tobacco or alcohol. Chronic poisoning from pyorrhoea, constipation, etc., may also be a factor.

The gravity of a cold varies widely ; it may not attack anything more than the lining of the nose and of the passages that communicate with the nose, such as the tear ducts, which carry the tears from the eyes to the nose, and the tubes which communicate between the ears and the back of the nose. Hence it is common to have some degree of deafness and unusual moistness in the eyes. The throat may also be affected, though it very frequently escapes ; sometimes the larynx may also be affected, or even the wind-pipe in the later stages of a bad cold.

The treatment of a cold depends on many circumstances. Most people take no notice of a slight cold, but if the temperature is definitely raised the patient should stay in the house, or even in bed. It should always be borne in mind that symptoms like those of a bad cold may inaugurate such diseases as measles and influenza. Further, it is necessary, as in every similar kind of disease, to get rid, as far as possible, of the poisons produced by the microbes that cause it, and to this end the patient must ensure free action of his skin by means of a hot bath, hot drinks, or some diaphoretic remedy such as Mindererus spirit, 2 to 6 drachms, or Dover's powder, 5 grains. An aperient should also be taken, a dose of castor oil or even something stronger, such as compound jalap powder, 10 to 60 grains.

Several remedies are used with the object of destroying the microbes concerned. These include ammoniated tincture of quinine, ½ to 1 drachm, in a mixture or in tablets, and cinnamon essence or spirit of camphor, 15 drops of either on a piece of sugar. To have any effect, these remedies must be used at the very outset of the disease. A hot mustard foot bath may help to clear the head, and for this purpose also a variety of medicaments may be inhaled or sprayed into the nose, such as carbolised smelling salts, pinol, eucalyptus or menthol. These may be inhaled from the bottle, from a handkerchief or from steaming water. For spraying they are mixed with liquid paraffin in an appropriate spray apparatus. A sore throat may be treated by gargling with a weak solution of permanganate of potash.

The diet should be light and easily digested. If the cold leaves some general weakness behind it, a suitable tonic would be Easton's syrup, in ½ teaspoonful doses, or the compound syrup of hypophosphites in teaspoonful doses thrice daily in a little water after food.

Liability to catch cold will be lessened by being as much as possible in the open air during epidemics of the disease. Fresh air is also an important element in successful treatment, as there is nothing more calculated to increase the hold which the disease has on its victim than the plan of keeping to a hot room of which all the windows are closed, and fresh air excluded.

The morning tub has the effect of increasing resistance to chills, and if for any reason it cannot be taken, some good accrues from douching the back of the neck and the shoulders with cold water every morning. A recurrence of colds may sometimes be prevented by the use of a vaccine. *See* Bronchitis ; Cough ; Eucalyptus ; Eustachian Tube ; Influenza ; Lotion ; Nose.

COLD CREAM. The ointment of rose-water of the British Pharmacopeia is popularly known as cold cream. It may be used for inflamed or irritated states of the skin, sunburn, for example, or for any other purpose where an emollient is indicated.

COLD PACK. A high temperature—for example, in fevers or heat-stroke—may be lowered, and the highly nervous state often found in fevers may be soothed, by the use of a cold pack. It is applied as follows :

The bed is covered with a waterproof sheet over which a blanket is laid. A sheet is wrung out of cold water and spread out on the bed. On this the patient is laid, stripped, and it is then wrapped round him as high as the armpits, the legs being wrapped up separately. The patient is then covered with one or two blankets which are tucked well about him. He may be left in this from 15 minutes to half an hour, when he should be dried quickly. *See* Delirium ; Fever.

COLIC. Pain due to irregular and violent contraction of various muscular tissues within the body is described as colic. According to the part affected we speak of intestinal colic, which is due to spasmodic contraction of the bowel ; of biliary colic, due to irregular contractions of the bile ducts ; of renal colic, due to irregular contractions of the ureter, and so on.

The cause of the spasmodic contractions is irritation of some kind ; for example, that due to a stone. All these muscular tissues are in regular action, but in health their work is entirely unnoticed by us. Their mode of contraction is wave-like, a sort of ripple of contraction runs along them, and this causes no sensation. But when their contraction becomes violently spasmodic extreme pain may be aroused.

The commonest form of colic is that arising from irregular contraction of the bowel, and this may be due to a variety of causes, such as indigestible food, chill or constipation. In chronic lead poisoning intestinal colic is a prominent symptom. Severe griping pains are felt around the navel ; the abdomen may be distended, and there may be constipation or diarrhoea.

It is sometimes very difficult to distinguish between pain due to inflammation, such as appendicitis, and that due to mere colic ; so that unless the colic is clearly due to indigestible food and responds quickly to simple remedies, it is well to call in a doctor at once.

The treatment alluded to consists in applying hot poultices or a hot water bag to the abdomen, and giving sips of hot water containing a little spirits, sal-volatile, peppermint water or essence or the essences of ginger or cinnamon. Where irritating substances have been swallowed and the colic is accompanied by diarrhoea, a dose of castor oil may be given, and to this may be added 15 drops of laudanum. But if there is the slightest doubt as to the cause of the colic, a purgative should not be given. It will be safer, then, to try to move the bowels by an enema consisting of a pint of warm, soapy water containing a tablespoonful of oil of turpentine.

Colic in infants may be due to difficulties in digesting milk, but common causes are undue exposure during the bath and cold feet. Sips of warm water and of dill-water may be helpful, and also warmth applied to the abdomen by a fomentation or hot bag. It is necessary to emphasise the importance of precautions against burning the skin when making these hot applications.

After an attack of colic, only milk food should be taken for a day, and for a few days longer the diet should be light; vegetables, fruit, or anything tough or stringy should be studiously avoided. *See* Carminative; Constipation; Diarrhoea; Dill-water; Indigestion, etc.

COLITIS. Inflammation of the colon or large intestine, technically known as colitis, may occur as a part of other diseases, for instance, the presence of a cancerous tumour in the bowel, appendicitis, tuberculosis, dysentery, etc., but it also occurs apart from other diseases and in several forms. These are simple catarrhal colitis, ulcerative colitis, and mucous or membranous colitis.

Acute simple catarrhal colitis begins suddenly with diarrhoea, pain in the abdomen and vomiting. The stools contain mucus or slime, and often bright blood. There may be cramps in the calves of the legs. Treatment for this and other forms of colitis should always be at the hands of a doctor, and in the present instance consists in putting the patient to bed, applying hot poultices to the abdomen and a hot-water bottle to the feet, and giving certain remedies, such as three minims of spirit of camphor every ten minutes for an hour, a starch and laudanum enema, etc. The diet should consist of liquids such as cold milk, to which may be added a tablespoonful of whisky or brandy to the glass, milk and lime-water, milk and isinglass, albumen water or barley water. The milk should be taken in sips.

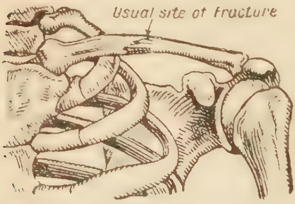
Ulcerative colitis usually affects men who are past middle age. It is characterised by brownish liquid stools with a foul odour, and containing pus and blood. Pain in the abdomen occurs in paroxysms, and may be of great severity. The disease may become chronic and leads to severe anaemia and prostration. The most successful treatment is by operation.

Membranous colitis is so called because the patient passes from the bowel shreds of mucus, which sometimes may take the form of complete casts of segments of the bowel. This may be accompanied by great pain, and there may be considerable tenderness on pressing along the course of the large intestine. The patient is a chronic dyspeptic and usually presents symptoms of hysteria or neurasthenia. Women are much the most frequent victims of this complaint.

Dietetic treatment differs in the practice of various doctors. Chronic constipation is the rule, and may be corrected by daily enemata of warm water or daily doses of castor oil. The Plombières treatment of douching the lower bowel sometimes gives very good results when efficiently carried out. The neurasthenic side of the symptoms must be met by appropriate treatment, rest, and interesting forms of light exercise, a change of environment, etc. *See* Constipation; Diarrhoea; Dysentery; Intestine; Neurasthenia; Obstruction.

COLLAPSE. After profuse bleeding, in cholera, in severe poisoning, after serious burns, and in a large variety of other disorders, the patient may become collapsed. He is pale and cold, the pulse and breathing are feeble, and while in some cases the mind is quite clear, in others consciousness is more or less impaired. A doctor should be summoned at once, and in the meantime the patient is kept warm in bed with his head low. Hot-water battles are placed at his feet and by his sides. It is not safe to give stimulants without medical advice. *See* Bleeding; Burn; Fainting; Shock.

COLLAR BONE. The clavicle or collar bone is the curved bone which runs from the top of the breast bone outwards to the shoulder. It is a somewhat slender bone and is frequently broken, since in falls upon the shoulder, or upon the hand, the force is often transmitted through this bone. The consequence is that the shoulder falls forward, downwards, and inwards, and, as one of the broken ends rides over the other, there is a lump on the course of the bone, easily detected by the finger. In order to make himself more comfortable, the patient usually supports the elbow on the injured side on the palm of his other hand.



COLLAR BONE and its attachments

The first aid treatment is described under the heading Fracture and is also illustrated in Plate 16. Generally a little deformity results if the patient walks about. Where, as in the case of a woman, it is desired to prevent any disfigurement, it can generally be achieved if the patient will agree to lie perfectly still on her back on a flat mattress and without a pillow until the broken ends have joined sufficiently firmly.

The subclavian artery passes beneath the collar bone, and at about its centre, and it thus lies on the top of the first rib. This is the site chosen to press on the artery for the arrest of bleeding. It is marked by a little depression or nest above and behind the collar bone (*see* Plate 10). *See* Bandage; Bleeding; First Aid; Fracture.

COLLES' FRACTURE. A fracture of the lower end of the radius just above the wrist is known as a Colles' fracture. It is caused by a fall on the hand with the arm outstretched, and produces a characteristic deformity. *See* Fracture; Radius.

COLLODION. Flexible collodion is largely used as a means of protecting wounds. When it is painted on the skin it soon dries and forms a thin film, which protects the wound and, owing to contraction, tends to keep the edges of the wound together. It must only be applied to wounds which are perfectly free from microbes and therefore yielding no dangerous products of inflammation. Collodium callosum and salicylic acid collodion are used to dissolve warts and corns.

COLLYRIUM. An eye lotion is sometimes called a collyrium. The one most commonly employed in Great Britain is made with boracic acid (q.v.).

COLOCYNTH. The fruit of the bitter apple, or colocynth, acts as a drastic purgative. An extract of the pulp is used to prepare purgative pills, for example, a compound colocynth pill and pill of colocynth and hyoscyamus. A medium dose of these pills for an adult is 5 grains. *See* Cathartic.

COLON. The greater portion of the large bowel is called the colon. *See* Intestine.

COLOUR BLINDNESS. This remarkable peculiarity of vision often goes by the name of Daltonism, since it was studied carefully by the great chemist, John Dalton, who himself was colour blind.

The disease is hereditary, but in a very peculiar way. Like the bleeder's disease, it is practically confined to men. It often skips a generation, and is very frequently transmitted from a grandfather to his grandson by means of a mother who is herself free from any defect.

The most usual form is a difficulty in distinguishing red and green, these colours being confused with grey, blue, and yellow. A violet-blind person confuses purple, red and orange. In some cases the defect is complete, and only black and white are distinguishable; short of this the degree of difficulty varies, and sometimes merely consists of hesitation with regard to some colour combination. There is no cure.

Colour blindness may be recognized by making a person match Holmgren's wools, which include many shades of colour; but the most reliable tests are those invented by Dr. Edridge-Green. *See* Eye.

COMA. The state of profound unconsciousness described as coma may be due to a large number of different causes; for instance, pressure within or upon the brain, the production of various poisons inside the body, the introduction of various poisons into the body from without, such as alcohol, opium, prussic acid, and indeed the whole group of what are called nerve poisons.

The distinction between these various causes of coma may be immensely important, and may be difficult to detect, even for the trained doctor. Disastrous results only too frequently follow the inexpert opinion that a comatose person is drunk, when in reality he is suffering from some grave disease or form of poisoning which is threatening his life, and which might be controlled if it were recognized. *See* Collapse ; Unconsciousness.

COMFORTER. The advantage of being able to pacify a baby by providing it with a comforter, or dummy teat, is heavily outweighed by the disadvantages. Its use may lead to deformity of the baby's jaws and palate, with narrowing of the nose passage and the institution of mouth breathing. In addition to this it commonly introduces infection into the baby's mouth, thus leading to diarrhoea and other disorders. In no circumstances therefore, should a comforter be used.

COMPLEXION. *See* Beauty Culture ; Face ; Sunburn.

COMPRESS. A compress is a folded cloth applied firmly to some part of the body to prevent haemorrhage or lessen inflammation. The application will be more successful if the cloth is wrung out of cold, and preferably iced, water. *See* Bruise ; Fomentation ; Poultice.

CONCUSSION. *See* Brain.

CONDENSED MILK. Condensed milk is cow's milk from which part of the water has been evaporated, and which has been sterilised by heat. The best is made from milk which is "whole," or to which cream has been added. Inferior condensed milk is made from skimmed milk and should only be used for cooking. A good deal of sugar is added to most kinds of condensed milk. When this is diluted sufficiently to make the proportion of sugar about right, the mixture is then deficient in cream. Unsweetened condensed milk, however, has not this defect, and on occasion it may be of use. It does not keep quite so well after the tin has been opened.

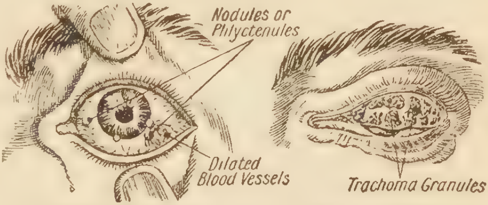
An infant's diet should not, as a rule, consist of condensed milk of any kind ; taken alone, such milk is a frequent cause of rickets. A restriction of the diet to condensed milk may also lead to the development of scurvy, as such milk does not contain the antiscorbutic vitamin. To remedy this defect the infant should be given a teaspoonful of orange-juice twice a day.

Dried milk, or milk in the form of a powder, is now made and is largely used in infant feeding. It avoids possibilities of infection inherent in fresh milk and, at least in the case of some brands, is said to be supplied with the necessary vitamins ; but even then orange-juice is advisable. Humanised dried milk is also obtainable, that is to say, cow's milk which has been so altered as to approximate in composition to human milk. *See* Baby ; Milk.

CONGESTION. When any organ or tissue is too full of blood, that is to say, when the blood vessels in it are stretched and over-filled, it is said to be congested. Blushing is a state of temporary congestion of the skin of the cheeks, and is not abnormal. But the cheeks may be similarly congested persistently, in consequence of disease of the tiny blood vessels in them, or some obstruction to the return of blood from them ; this would be a case of morbid congestion.

Congestion, also, is the first stage of the process which is called inflammation. It is not to be regarded as either bad or good in itself ; it may be either. Sometimes it is deliberately sought for its beneficial results, as when a mustard plaster is used, or in what is called Bier's treatment (q.v.) for joints affected by tuberculosis or other diseases. On the other hand, chronic congestion may be an annoyance, as, for instance, when it affects the womb, or the throat in people who have to use the voice extensively. Probably its most common causes are chronic irritation and over-use of the congested part ; and thus the treatment of congestion cannot be discussed as if this were a disease in itself, for it depends entirely upon the various causes which may lead up to the condition in any given case. *See* Circulation ; Hyperaemia ; Inflammation ; Liver ; Plethora, etc.

CONJUNCTIVITIS. The term conjunctivitis means inflammation of the conjunctiva, that is, the membrane that lines the eyelids and covers the white of the eye. This may arise from a large number of circumstances, and it is found in a variety of forms. As there may be more or less serious damage to vision following in its wake, any but the slightest cases of conjunctivitis should have prompt medical care.



CONJUNCTIVITIS. Two forms of this inflammatory disease of the eye : **left,** phlyctenular type ; **right,** trachoma, showing inner surface of eyelid

Simple catarrhal conjunctivitis may be caused by smoke, dust, the abuse of alcohol, the activity of microbes, and other causes. In the acute form the conjunctiva on the ball of the eye and that on the lids are both involved. The eye looks bloodshot, and the little fleshy mass at the inner corner of the lids is specially noticeable. There is itching, burning, and a sensation of grit under the eyelids. A sticky secretion is poured out from the conjunctiva, and through this it is often found that the edges of the eyelids and the lashes are glued together in the morning. Frequently the discharge contains pus or matter. Sometimes the eye becomes very painful and exposure to a bright light causes acute discomfort.

In treatment the first thing to consider is the cause, since when this is removed, as, for example, a foreign body in the eye, simple measures usually bring about a quick cure. The eye should be washed frequently and freely with boracic acid lotion. A dropper may be used for applying certain medicaments, as shown in Plate 20. The edges of the eyelids should be anointed at night with an ointment consisting of vaseline, with 10 grains of boracic acid to the ounce, in order to keep them from adhering. As a rule, the eye should not be bandaged.

Chronic catarrhal conjunctivitis is usually limited to the conjunctiva of the eyelids, the edges of which may also show evidences of inflammation. The possibility of the inflammation being due to eye strain should be remembered, and the sight should be tested. A useful lotion for this condition consists of 5 grains of boracic acid and 1 grain of zinc sulphate in an ounce of distilled water. If there is any deposit at the bottom of the bottle it should not be shaken up.

A very serious form of conjunctivitis is caused by the germ of gonorrhoea. Its importance may be estimated from the fact that it is responsible for a third of all cases of blindness. It should be noted also that nearly all the blindness due to this cause results from the occurrence of the disease in newly-born children, and that it is preventable.

In infants the first signs usually appear about the third day after birth. The eyelids become red and swollen, and there is a sticky discharge, clear or mixed with blood. A few days later the discharge consists of thick yellow matter. The cornea, or clear part of the eye, may become the site of a suppurating ulcer, and through this the whole eyeball may become inflamed and be destroyed ; or, if the ulcer heals up, a white scar or leukoma remains, and this destroys vision according to its extent.

The treatment of this condition, which is known as ophthalmia neonatorum, demands unremitting medical and nursing skill. The preventive measures which would almost invariably be successful are to wash the eyes with a clean rag first of all, when the baby has its first bath after birth, and the use by the doctor of drops containing some preparation of silver.

Trachoma, which is also known as granular or Egyptian ophthalmia, is a form of conjunctivitis in which granules appear on the inner surfaces of the eyelids. It is contagious, and the disease runs a long course.

There are two other forms of conjunctivitis which are sometimes confused with trachoma. One is the follicular conjunctivitis, which is usually found in young people, and which consists of pinkish-grey granules on the inner surface of the eyelids, chiefly the lower one.

The other condition is known as spring catarrh. Here there are also granules on the inner surface of the lids, but these have a sort of tesselated or pavemented appearance. Besides this, the white of the eye on either side of the cornea may show a reddish-grey discoloration, and the surface of the conjunctiva may have an opaque, milky appearance.

Symptoms similar to those described for catarrhal conjunctivitis may be present, and there may be a mucous or a muco-purulent discharge. This disease occurs most often in young men, and hot weather seems to have much to do with bringing it on. Treatment by radium seems to have some effect.

There is another form of conjunctivitis which is known as the phlyctenular, eczematous or scrofulous type. It is mainly found in children who are of a scrofulous habit or whose health has been reduced by an attack of measles, whooping-cough, scarlatina or something of the kind. It consists of minute pustules, or blisters filled with matter, which make their appearance on the white of the eye just outside the cornea and which are surrounded by a small area of inflammation. These may invade the cornea and give rise to ulceration. It is usual to find at the same time eczema of the eyelids, the face and the head, and also chronic inflammation within the nose. In addition to local treatment it is essential that the general health should be improved by fresh air, good feeding, cod-liver oil, and perhaps syrup of the iodide of iron. *See* Eye.

CONSTIPATION. The failure of the bowels to open easily and regularly, which is described as constipation or sometimes costiveness, is a very common complaint, probably more common nowadays and amongst civilized peoples than in the past and amongst savages. The reason for this is plain. The proper action of the bowels depends upon their due stimulation by their contents. This stimulation is always forthcoming when the food taken is coarse and contains an abundance of waste matter. The impulse to relieve the bowels is increased by the presence of liquid in the contents, and this is the reason why an enema is so speedily effective.

If the impulse is not followed up, it may pass away for the time being, and the bowel content becomes dried. The impulse may not return for several days, and the bowels may then be evacuated naturally and resume their regular action. But sometimes the hardened faeces irritate the delicate bowel lining and produce the painful affection known as fissure.

Some people allow their bowels to become bound up for several days and then seek relief by taking a brisk purge. This practice is wrong, because an action of the bowels caused in this way is followed by reaction in the shape of constipation, and thus a vicious circle is established. In the circumstances mentioned it is better to use an enema of soap and water, containing castor oil or olive oil. This also lessens the danger of a fissure.

Chronic constipation is liable to cause piles, and congestion also of neighbouring organs, as, for example, the womb in women. It may give rise to colicky pains in the abdomen and the digestion may be upset, the tongue being furred and the breath foul. The absorption of poisons produced by the stagnant bowel contents may cause very considerable depression of body and mind.

When it is asked what constitutes constipation, it must be allowed that what is normal for one person is not so for another. Undoubtedly the majority of people do rightly to observe the rule of " once a day "—a sort of natural rule which is convenient and safe. A regular time should be chosen, and the best is undoubtedly after breakfast, for the mere taking of breakfast helps to stimulate the bowel. Taking coffee with breakfast increases this stimulation, and many men find that a smoke does so also.

It follows from what has been said that the rational means of treating constipation is by a change in the diet, so that it comes to include more of those indigestible substances which are contained in the diet of natural man. For instance, the substitution of wholemeal bread for ordinary white bread may make the necessary difference, owing to the presence of the bran in the former.

Other foods that are desirable in this connexion may be noted ; fruit in general, notably figs, raw apples, and prunes ; vegetables, especially those that have a large residue, such as cabbage, and also tomatoes ; honey and marmalade, which so many people use for this purpose ; and treacle and porridge. Many people might with advantage go the length of taking a course of vegetarianism.

Equally important to such modifications of the diet is the attempt to form a regular daily habit at a constant hour. There is no doubt that abdominal massage is often useful in helping to restore the tone of the bowel. Much success has followed the device of filling a leather ball with swan shot and rolling it over the abdomen as one lies in bed in the morning. The ball should weigh about five pounds and, beginning above the right groin, should move round the abdomen in the direction of the hands of the clock. Short of this it is a useful measure to improve the tone of the muscles of the abdominal wall by bending the thighs up and down for a few minutes every morning in bed before getting up. Regular exercise in the open air is an important help.

But if all these measures have failed, recourse must be had to the use of drugs, although full reliance must never be placed on them alone. A very large number of drugs which have an action upon the bowels either tend to lose their property in time, or they induce laziness on the part of the bowel itself, or they have a definite after-action, as explained above. These drugs have their uses at one time and another, but they are one and all condemned for cases of habitual constipation. In other words, the object of the drugs must be to give a tonic to the muscular wall of the bowel, so that by an improvement of its health it is enabled to do its own work for itself without artificial assistance.

Of drugs that answer to this description three may be noted. Aloes has long been popular, and is certainly the most widely used of all, since it is present so frequently in patent medicines. Nux vomica, containing the valuable tonic strychnine, is also widely employed. Probably better than either of these in the majority of cases is cascara sagrada. It can conveniently be taken in the form of capsules, tablets or pills ; the liquid preparations have an intensely bitter taste, which may be corrected by flavouring agents, as in the aromatic syrup of cascara, and similar mixtures. Properly used, and accompanied by other measures, it is a means of curing, as distinguished from removing, the symptoms of chronic constipation. It may be given in small doses three or four times a day, or in a single dose at bedtime.

The doses usually taken are far too large for the best results. They should be just sufficient to produce one natural movement of the bowels each day. An adult might begin with 2 grains of the dry drug in pill or tablet, or 20 drops of the liquid extract, thrice daily, or 4 grains and half a drachm respectively at bedtime ; and either increase or diminish the dose until the correct one is discovered. This should be continued for about a fortnight and then be gradually reduced until in about two months' time the drug is discontinued altogether.

Amongst other drugs used for chronic constipation, mention may be made of sulphur and liquid paraffin. The habitual use of salts is decidedly not good treatment. Pregnant women appear to do best on a teaspoonful of castor oil at bedtime.

With reference to constipation in children, it may be observed that during the first year of life the bowels usually move two or three times a day ; in the second year twice, and thereafter once daily. In the case of infants, constipation may be due to a deficiency of sugar or of fat in their diet, and an additional ration of either of these should be tried, fat being given in the form of fresh cream, a teaspoonful once or twice a day. When a child strains much at stool, better than opening medicine is a small enema of soap and water, or a glycerin or soap suppository.

It should be pointed out that much may be done in training even young infants to have regular habits in this respect. When constipation is habitual cascara is again probably the best remedy, and it should be used on the principles already laid down. The initial dose might be 5 drops of the liquid extract in simple syrup, or twice this amount of the aromatic syrup of cascara, once or twice daily. Olive oil, ½ to 2 teaspoonsful, according to age, and given the last thing at night, is often successful in children.

Simple constipation only has been hitherto considered, but it must be noted that interference with the action of the bowels may be due to a large number of much more serious causes, such as the presence of various obstructions. The detection of the nature of such cases is a matter for the most expert skill. *See* Aloes; Aperient; Cascara Sagrada; Cathartic; Grape Cure; Intestine; Intussusception; Piles.

CONSUMPTION: CAUSES AND TREATMENT

Some Practical Knowledge about a Dreaded Disease

The following article, specially written for the lay reader, contains useful information concerning the detection and treatment of consumption. Consult also Broncho-pneumonia; Disinfectant; Dust Disease; Fibrosis; Guaiacol; Lung; Pneumonia; Tuberculosis; Ventilation

The disease which is best known as consumption or decline is sometimes also referred to as phthisis, but it is more accurately described as tuberculosis of the lung, which implies that it is a diseased process in the lung due to the presence and activities of a microbe known as the tubercle bacillus.

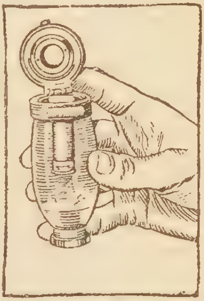
To say that a person is in a decline is to express, however, in a vivid way what is the most usual course of the disease. It consists of a gradual sapping of the strength and a gradual wasting of the body. Such things may be present before the development of a cough, though a short, dry cough is often the first thing that draws attention to the patient. It may be observed that when the patient attempts to go on with his work or exercise as usual he is unduly fatigued and easily made short of breath. If his pulse is counted it may be found unduly quickened by exercise and slow to return to its ordinary rate when at rest, while the temperature, if taken for a number of successive evenings, may be above the normal. The patient may also exhibit a pallor of the face which is shared by the lips and gums, and if his weight be taken at intervals of some days, a progressive fall may be evident.

Another suspicious symptom is spitting up blood. This may be the first sign of the disease, and occur in a person who is apparently quite well. Blood may be spat out in a number of other conditions—for example, unhealthy state of the gums—but when the amount approaches a teaspoonful it is safer to assume that it means tuberculosis of the lung.

However it begins, if the disease is allowed to progress the cough becomes worse, and some sputum is brought up. If this is examined it may be found to contain the tubercle bacillus. As time goes on the sputum becomes more purulent; it may also become very offensive, due to the invasion of the lung by putrefactive bacteria. Signs of fever become more manifest: a constant elevation of the temperature with an additional rise at night, a hectic flush and drenching sweats at night or during the day if the patient goes to sleep. Loss of flesh continues till there is great emaciation.

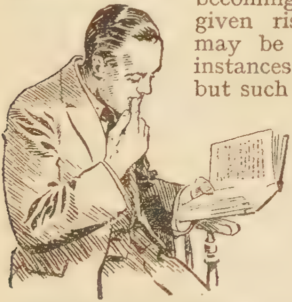
The disease may also occur in acute forms. These acute cases are popularly referred to as galloping consumption, and may either resemble lobar pneumonia (q.v.) or broncho-pneumonia (q.v.). These almost always proceed rapidly to a fatal termination, though sometimes they settle down to the chronic form.

The tubercle bacillus may be present in the sputum of a person suffering from the disease; it should be added that it may be present in enormous numbers. When the person coughs or talks loudly the germs are spread in the spray which comes from his mouth, and in this way they may be carried for a distance of many feet. If the patient spits on the street, into a common spittoon, or into a handkerchief, the sputum may dry and the microbes be widely disseminated by the dust to which they become attached. There is thus a possibility that other people may inhale the infected air, when the microbes may be carried directly into the lungs. More frequently they adhere to the lining of the mouth or the throat through which they make their way or, they are swallowed and pass through the bowel lining.


CONSUMPTION. Sputum flask for consumptive patient

The tubercle bacillus also occurs in cattle, and may be ingested in butcher's meat which has not been properly cooked. But this source of infection is insignificant as compared with the milk of tuberculous cows. The microbes are also found in butter and cheese made from tuberculous milk. Bovine tuberculosis is not common in adults, but is quite a frequent cause of enlarged glands and of acute tuberculous affections in children.

It is common knowledge that tuberculosis may occur as a family disease, the children of tuberculous parents very often becoming affected also. This has naturally given rise to an opinion that the disease may be inherited. There are undoubtedly instances where an unborn child is infected, but such are believed to be uncommon. It is considered also that in some families there may be inherent weakness of resistance to the activities of the tubercle bacillus.

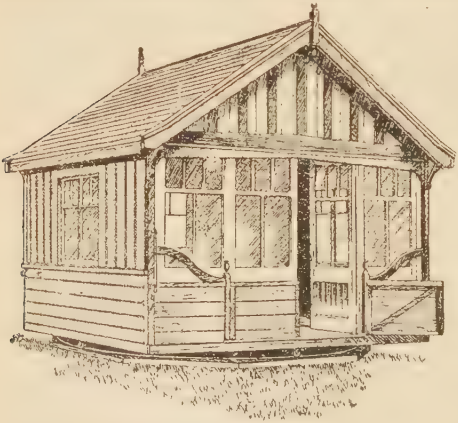

CONSUMPTION. One way of spreading the disease

In considering the chances of an individual becoming the subject of tuberculosis, this inherent susceptibility would appear, however, to be relatively unimportant as compared with his opportunities of becoming infected. Cogent evidence has been adduced for the proposition that infection with pulmonary tuberculosis always takes place in the first two years of life, and that whenever it occurs at a later age it is merely a recrudescence of the old disease. Sufficient has been said to show the imminent danger in a household, unless strict precautions are taken. The danger will be increased if the accommodation is restricted, and if the premises are dark and badly ventilated. It will be further increased if the inmates have an insufficient supply of food.

Damage to the lung by other diseases predisposes to tubercle, and thus the disease often attacks children who suffer from broncho-pneumonia, either in connexion with measles, whooping-cough or otherwise. The same liability is shown in the case of those whose occupations are carried on in an atmosphere charged with dust, such as steel grinders, quartz miners, potters and so on. It is quite a common thing for people who suffer from debilitating diseases, diabetes, for instance, to contract and die from tuberculosis of the lungs.

When tubercle bacilli invade the tissues of the body they are taken along lymphatic channels. They thus reach lymphatic glands, where they may remain and multiply, or they may pass on to other glands. From these they pass out through the lymphatic vessels to different organs, and as the lungs contain an enormous number of such vessels it is natural that they should be such a common site of tubercular disease. From the glands they may make their way also into the blood stream and pass on till they reach the smallest blood vessels, the capillaries, which also are found to an enormous extent in the lung tissue.

It is the habit of the white blood corpuscle to kill and devour microbes which it has taken into its substance, but this it has difficulty in doing in the case of the tubercle bacillus, because this organism has a protecting outer fatty envelope. It is thus the white blood corpuscle which is usually killed, while the microbe survives and multiplies. When this is going on the microbes become surrounded by a collection of cells forming tiny nodules, which are known as tubercles, whence the name tuberculosis is derived.


CONSUMPTION. Open air revolving shelter
Courtesy of Boulton & Paul, Ltd.

The tubercles may collect into masses and may infiltrate the lung tissue. This new material may degenerate into a cheesy mass, which may be softened and be coughed out, leaving a cavity; sometimes, however, it is converted into a hard mass through becoming permeated with lime salts. For protection against the bacilli there tends to be produced round the tubercles new or scar tissue, and then the infection may be walled off. This process, which is known as fibrosis, may be very extensive, and as the scar tissue contracts, it may drag on the heart and displace it far from its normal position. Fibrosis is the natural process of cure.

The cavities produced in the lung have at first raw ulcerated walls. Vessels in their walls may become involved in the ulceration process and be opened, thus giving rise to more or less bleeding. These cavities also tend to be invaded by putrefactive organisms, and then their contents may become very offensive.

The treatment of consumption requires the supervision of the doctor at every stage, and it will be sufficient here merely to outline the lines of treatment which are usually adopted. When the disease shows that it is active, for example, by a rise of temperature, loss of weight, and so on, the patient should rest in bed. It is a desirable thing that patients in whom the disease is even only suspected should rest until the true nature of their condition is cleared up. In all cases where the existence of the disease in active form is established, rest in bed must be prolonged until it becomes quiescent, that is, for two months at least, though it may be four, six, or more months. As the object of rest in bed is to diminish as far as possible the movement of the damaged lung, it is necessary that the patient should do as little talking as possible so as to further this purpose.

The patient's bed should be placed either in a room close to a widely open window, one with the sashes taken out being the best, on a veranda or in a garden shelter. In certain circumstances it may be necessary to go to a hospital or to a sanatorium. Fresh air and sunlight are what principally matter in the choice of a sleeping apartment.

If it is possible to have a shelter in the garden it is a decided gain (*see* Plate 19.) This should preferably be a revolving one, but if not it should face south-west. It should have a shutter or a screen to let down quickly to keep off rain. The patient should begin sleeping in it in fine weather, and its benefits will be appreciable at once. The cough will be eased and the night sweats may cease.

The patient should be washed all over each day, and should have his teeth and mouth cleansed several times a day, using a weak antiseptic mouth wash (q.v.).

The diet must be as liberal as can be digested and assimilated, but the patient's powers in these directions will vary and must be studied. Here there is great scope for care in choice and cooking of food. An abundant supply of milk should be given, and when solid food appears to be digested with difficulty, recourse should be had to raw eggs and raw meat. The latter may be given in the form of meat juice or be pounded or minced, when it can be served in sandwiches, in milk, or in warm soup.

Cod-liver oil (q.v.) has long been known to have a favourable effect in tuberculosis. It acts both as a remedy and as a food, and should be taken whenever possible. It is best to begin with a small dose after a meal. The patient should not smoke, and should only take alcohol on the doctor's advice. Sometimes a little light beer or wine helps the appetite and digestion. When the patient begins to get up he should be careful to rest for half an hour before, and the same time or longer after, his meals.

It may be necessary to do something for one or other of the symptoms on occasions when the doctor is not at hand. Thus, if the temperature runs up to the neighbourhood of 103° F., sponging with tepid water and vinegar will help to keep it within bounds. If there is pain in the chest or abdomen, it may be relieved by applying a hot-water bottle or a mustard plaster.

Bouts of prolonged coughing may be due to pharyngeal irritation, caused sometimes by cigarette smoking, and may be eased by gargling with warm water containing bicarbonate of soda or alum. A mixture of hot milk and soda water, half and half, containing a pinch of bicarbonate of soda is often useful, as are glycerin or liquorice pastilles. If the patient brings up a considerable amount of blood in coughing, he should rest quietly till the doctor sees him. Meanwhile, he can be reassured as to the outcome of the accident, as haemorrhage in consumption is rarely, in itself, fatal.

Night sweats may be lessened by sponging with tepid water and vinegar at bedtime. Sleeplessness is often cured by a glass of hot milk. If breathlessness occurs it may be relieved by giving a teaspoonful of sal volatile with the juice of half a lemon in a wineglass of water, mixed and taken quickly.

It is a great advantage to a patient to have a course of sanatorium treatment. Dryness and sunshine are the considerations leading to the choice of sites for these institutions, and this is of great importance to the patient at all times, but certainly when he is well enough to go out of doors. Of equal importance is it that he be under constant observation and trained in the routine necessary in treatment. His capacity for exercise can be accurately gauged, and exercise and work graduated accordingly.

The relapse of patients who have enjoyed sanatorium treatment would often appear to be due to a failure to observe the rules taught there, neglect to take the temperature, for example, or to exercise care when it is found to be going up regularly. People who have suffered from consumption require to take special care of themselves for the rest of their days.

After leaving a sanatorium it is an undoubted advantage to go to a farm colony. When the time comes to consider how a living is to be earned, a number of factors have to be weighed. The mere fact that the occupation is carried on in the open air is no advantage if the work is too heavy and the emoluments insufficient. If an office or a factory is clean and well ventilated, the work not too hard, and the wage will provide a sufficiency of food and comfort, indoor employment may be quite a suitable choice.

In cleaning out the room occupied by a consumptive, care should be taken not to raise the dust. Tea-leaves should be sprinkled on carpets and rugs before sweeping, or a vacuum cleaner used, and dusting should be done with a damp cloth. Sweepings should be burnt at once, and dusters should be soaked in disinfectants after use. It is better, also, to dispense with a carpet and to lay down a few rugs which can be taken out and exposed to the sun, as sunlight has a powerful effect against the activities of the tubercle bacillus. For the same reason the rooms should, as far as possible, be kept flooded with light.

Turning to the question of food, so important in building up resistance to disease, it should be noted that growing children require a large amount of protein food and that this is most easily supplied in the form of meat. The cost of meat prohibits in very many cases the supply of an adequate amount of it for children, and so it should be remembered that oatmeal and fresh herrings are cheap and also valuable feeding stuff.

There has always been a difficulty in obtaining milk which can be guaranteed free from bovine tuberculosis. This is very important, in view of the fact that a very large number of children become infected with bovine tuberculosis. It is now possible, however, to obtain milk certified to be derived from cows which have successfully passed through a test with tuberculin, and which are presumably free from tuberculosis. A large amount of milk is, and probably will be, used which is not of this class. The tubercle bacilli may be killed by boiling milk for a few minutes, but if this be done it should be borne in mind that the milk has thereby been deprived of its supply of vitamin, so that this must be made up in other ways.

A consumptive mother should not nurse her baby, and should be careful about touching the baby's mouth or eyes, or the teats of feeding bottles, as she may readily convey infection on her fingers. The bad habit of moistening the fingers when turning over the pages of a book is especially dangerous when employed by consumptives. Those who have to handle consumptives, or even live with them, should be the last to forget the hygienic rule of washing the hands before handling food, whether at meals or otherwise.

The correct disposal of the patient's sputum is of the utmost importance in prevention of the disease. A patient who goes out of doors should always carry a sputum bottle or flask. This should contain a small quantity of some antiseptic solution, and care should be taken when spitting that all the sputum goes properly into the bottle. Pocket handkerchiefs should on no account be used for this purpose. When indoors, paper handkerchiefs may be used, but should be burnt immediately. If jars or anything of the kind are used they should also contain an antiseptic solution.

It is not safe to have children in a house with a patient who is expectorating tubercle bacilli. If the patient cannot be taken to a hospital, the utmost endeavour should be made to get the children away to a healthy environment. Bedclothes and other clothing used by the patient should be effectively disinfected by soaking in solutions of carbolic acid (1 in 20), or of lysol or some other disinfectant before being washed.

Tuberculosis is a notifiable disease, and in most places the sanitary authority will attend to the disinfection of clothing and of rooms. The existence of tuberculosis dispensaries and of health visitors is also of the greatest service in the treatment of the patient and in advising as regards preventive measures.

CONTAGION. Strictly speaking, a contagious disease is one which is communicated by touch or contact; and there are some diseases of which this can literally be said, as, for example, syphilis, leprosy or ringworm. In such cases another person contracts the disease by coming into contact with a part of the patient's body which harbours the infective organism or with something which has done so.

The terms contagious and infectious are used, however, rather loosely as meaning the same thing, and this association is easily explicable when it becomes apparent that in both cases an infective organism passes from one person to another, and that in every case, although it may be indirectly, contact of some kind must take place. A consumptive, for example, spits on the ground; the sputum dries and rises into the air as fine dust; the air is breathed by a second person, and he may contract the disease. A person suffering from influenza sneezes. The fine spray which he ejects carries infective organisms to a person who happens to breathe in the air charged with the spray. *See* Carrier; Flies; Infectious Disease.

CONVALESCENCE. The period which elapses between the end of an illness and the recovery of normal health is one of great importance. It may be prolonged by injudicious treatment, and out of it sometimes arise other and graver disorders, such, for instance, as tuberculosis. The gap between acute illness and the resumption of bodily health may be surprisingly short in such a disease as pneumonia, in which the patient may speedily acquire a good appetite and powers of digestion and assimilation. On the other hand, convalescence from influenza may be remarkably prolonged and unsatisfactory, even after apparently mild attacks.

The difficulty in dealing with convalescent patients is that often they insist upon overtaxing their strength. What a convalescent can do is always a matter for the doctor to decide, and patients and their friends will find it true economy to abide by his instructions in the matter.

Fitness for getting up will be hastened by regular daily massage, and this may be begun early. Fitness for going into the open air will be furthered by keeping thoroughly well ventilated all rooms in which the patient may be. Draughts must, of course, be avoided, but this is best done by having a window widely open. Resistance to cold will also be improved by gradually cooling the water used for the daily sponge bath. When the patient sits up, and later gets out of bed, he should be kept warm by wearing sufficient clothing rather than by warming of the room. On the other hand, convalescents are often over-clothed, more particularly children.

Tact will be required with regard to the admission of visitors. At first few should be allowed into the sick-room and only for short visits, while later a discrimination must be exercised between those who help the patient and those who worry and bore him.

The subject of diet is very important at this period. The food must be such as is suited to the patient's powers of digestion, and items of diet will gradually become admissible in the stages roughly indicated in the list given below. The rate of progress from stage to stage will, however, vary widely for individual patients.

(1) Milk, alone or with soda or potash water, Benger's food, Allenbury's Diet No. 3, chicken soup, beef tea, egg flip, thin arrowroot made with milk, rusks, tea and coffee.

(2) Calf's foot jelly, chicken jelly, mutton broth, thin bread and butter, toast, plain biscuits, plain sponge cakes, milk jelly, junket.

(3) Oatmeal porridge, good milk puddings and custards, eggs poached or soft-boiled, steamed fish (whiting, sole, plaice or haddock) with milk sauce.

(4) Cauliflower with white sauce, spinach, tripe or sweetbreads, chicken or rabbit, baked apple, a little fresh fruit, roast mutton, or the eye of a tender mutton chop with a boiled mealy potato.

In many cases a tonic of some sort is an important aid to recovery. After fevers and other illnesses, when the appetite is poor, it may be improved by giving a mixture like the following:

Tincture of cascarilla	3 drachms
Tincture of orange	2 drachms
Syrup of orange	4 drachms
Chloroform water	to 6 ounces

Take a tablespoonful thrice daily in a wineglass of water, after food.

Other useful tonics are the compound syrup of glycerophosphates, dose 1 to 2 drachms, and the compound syrup of hypophosphites, ½ to 2 drachms, the dose of either of these being taken thrice daily in a little water after food. Children may be given the compound syrup of iron phosphate B.P.C. (chemical food), 10 to 30 drops or more, or syrup of the iodide of iron, 10 to 20 drops. In many cases it proves of immense advantage to give cod-liver oil (q.v.) in some form. When convalescence is slow an attempt should be made to secure a change of air, if the weather and other circumstances are suitable. *See* Diet; Invalid Cookery; Massage; Nursing.

CONVULSIONS. Involuntary paroxysmal movements of certain of the muscles of the body, or convulsions, are due to some disorder of the nervous system, which controls them all. Convulsions may be local or general, and their causes are very numerous. This article will be confined to the convulsions of children, usually known as infantile convulsions.

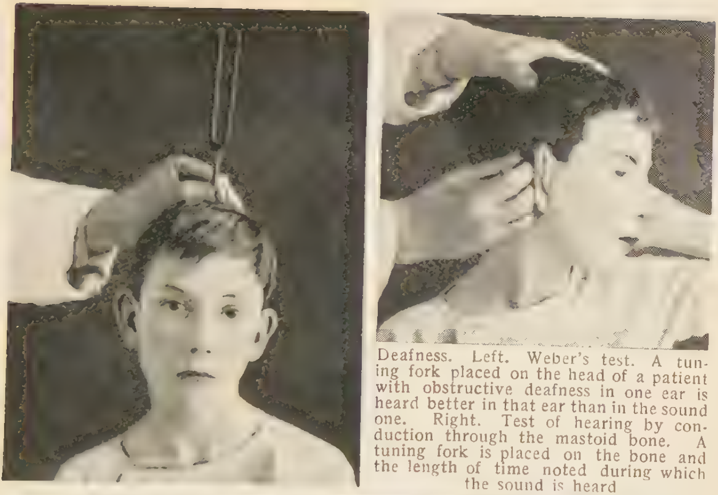
These occur, it is said, amongst children because their nervous systems are more sensitive than those of grown-up people, and this is true so far as it goes. Again, it seems certain that convulsions are more likely to occur in children who inherit a certain unsteadiness of the nervous system, children who come of what is called a neurotic stock. The great majority of children who suffer from infantile convulsions, however, show clear evidence of the existence of rickets. Given these conditions, and especially the last, very trivial causes will set up convulsions, chief amongst them, without a doubt, being a disturbance of the alimentary canal. Convulsions often usher in acute infectious diseases in children.

The child is seen to become pale and unaware of its immediate surroundings, then it becomes unconscious and the convulsions begin. Afterwards the child is very sleepy. It is almost always noticed that its fingers are tightly clenched upon its inturned thumbs.

The large majority of cases of convulsions do not indicate immediate danger. If the child is put in a comfortable position in bed, with its clothes quite loose, it will soon pass into a state of more or less natural sleep. There is no need to apply cold water to its head unless high fever is present. There seems to be no question that the placing of a child in a warm bath has a wonderfully soothing effect upon the nervous system; if the water is very hot the opposite effect may result. It is often beneficial also to clear the bowel by an enema of soap and water. Great care must be exercised in giving this.

But it is less important to interfere with the convulsions themselves than to remove the cause which produces them; and this is not done by drugs, save in a very small degree. In all cases evidence of the presence of rickets should be sought for and, if found, appropriate treatment should be adopted. *See* Eclampsia; Epilepsy; Fit; Hysteria; Rickets; Strychnine; Teeth.

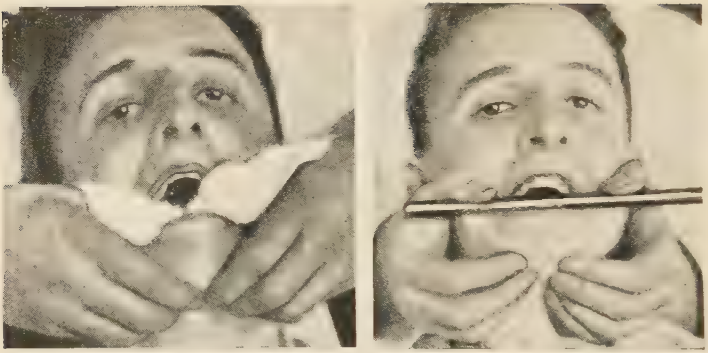
COPAIBA. Obtained from trees which grow in South America, copaiba belongs to the class of substances known as oleo-resins, that is to say, mixtures of essential or volatile oils and a resin.



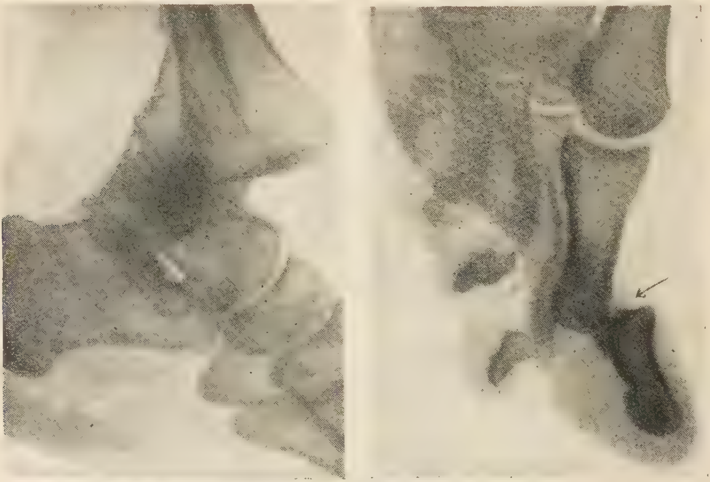
Deafness. Left. Weber's test. A tuning fork placed on the head of a patient with obstructive deafness in one ear is heard better in that ear than in the sound one. Right. Test of hearing by conduction through the mastoid bone. A tuning fork is placed on the bone and the length of time noted during which the sound is heard

In chronic deafness lip-reading should be taught as soon as possible. One way is by the use of a mirror

DEAFNESS HELPED BY MODERN METHODS



Left. A dislocated jaw can be reduced by pressing with the thumbs back and down. Right. A thin walking stick used instead. Either should be placed as far into the mouth as possible



Left. Dislocation at the ankle joint; the foot is here seen to be displaced backward. Right. Dislocation of the great toe. this might occur from kicking hard with unprotected toes

DISLOCATIONS OF THE JAW, ANKLE, AND GREAT TOE

It is chiefly used in medicine for the treatment of gonorrhoea; but it has other uses, as, for example, in chronic bronchitis, where it acts as a stimulating expectorant. The dose of copaiba is ½ to 1 drachm, and that of the oil extracted from it 5 to 20 minims.

COPPER. Salts of copper are used in medicine. Blue stone or copper sulphate is sometimes given as an astringent to check chronic diarrhoea, but the chief purpose for which it is used internally is as an emetic, when it is given in doses of 5 to 10 grains. Its action is rapid, and it is especially valuable in poisoning by narcotics and in acute phosphorus poisoning. It should only be used under medical supervision, however.

Blue stone is often used to reduce exuberant granulations or proud flesh. Solutions of the drug are antiseptic, and a 1 per cent solution is sometimes painted over a stye after the lash in the centre has been pulled out. The application is made every hour.

Poisoning by Copper. Verdigris is acetate of copper, and its accidental ingestion may cause symptoms of acute irritant poisoning, vomiting and so on. The treatment is to wash out the stomach by copious draughts of tepid water and to give white of egg. *See* Poisoning.

CORN. It is a general rule that pressure upon any part of the body, provided that it be not continuous but intermittent, tends to cause overgrowth. According to our present customs, our toes and also the soles of the feet are exposed to this intermittent pressure, and the result very frequently is overgrowth of the part most exposed to it. The overgrowth, in the case of a corn, mainly consists of the outermost layer of skin. This in itself is quite insensitive, and the pain of the corn is entirely due to the pressure which the thickened outer skin transmits to the sensitive tissues beneath.

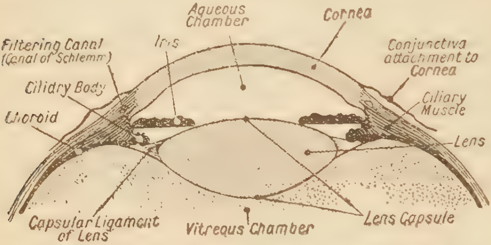
The obvious means to prevent corns is to have the footwear sufficiently roomy, but not too much so, otherwise the foot will move about too much within the boot and cause rubbing. If there are ridges, creases, or lumps in boots or shoes, they should be removed by a shoemaker.

The proper way in which to dispose of the corn is first of all to pare it down and then to paint it night and morning with some such substance as salicylic collodium or collodium collosum. Afterwards, in addition to wearing proper shoes, pressure may be taken off the site of the corn by means of a corn plaster, which is a pad with a hole in the middle. If this be done the whole corn will disappear and will remain away so long as the cause which originally produced it is not applied again (*see* Plate 20).

Soft corns require rather different treatment, because it is impossible to dispose of them until they are made dry. This is to be done by separating the toes with cotton wool and covering the corn with some boracic acid or some other dry antiseptic powder; and then, when the corn becomes quite dry, it can be disposed of in the same way as the others.

It is to be noted that in very old people, whose blood vessels are diseased, there is some risk of causing mortification if a corn is pared so closely as to admit germs into the living layer of the skin.

CORNEA. By the cornea is meant the transparent part of the eye, through which are seen, when looking at an eye, the coloured ring of muscle, the iris, which lies behind, and the pupil, the dark hole in the middle of that ring. The cornea is plentifully supplied with nerves, and is very sensitive. A foreign body in this situation, therefore, causes considerable discomfort, and may be very painful. Frequently by the closure of the lids and the free flow of tears the foreign body is whisked or washed off, but it often adheres to the surface, and may be embedded in the cornea.


Aqueous Chamber
Cornea
Filtering Canal (Canal of Schlemm)
Iris
Conjunctiva attachment to Cornea
Cilidry Body
Ciliary Muscle
Choroid
Lens
Capsular Ligament of Lens
Vitreous Chamber
Lens Capsule

CORNEA. Diagram showing the cornea and the parts of the eye that lie behind it

Beyond putting a little clean castor oil or vaseline into the eye, nothing should be done pending the attention of a doctor. After injuries of this kind the eye must be protected for a few days and washed frequently with boracic acid lotion.

Inflammation of the cornea, which is known as keratitis, may result from various causes, and leads to a clouding of its transparency, either gradually or in spots. Ulceration of the cornea may follow on injury or disease, and usually causes severe pain, a free flow of tears and intolerance of light, so that the patient must keep his eye shut. After ulceration or inflammation scars may be left in the cornea, and if near the middle of the structure may interfere with vision.

Very frequently the cornea is not perfectly shaped; it is curved too much when looked at from above downwards, as compared with its contour from side to side; or vice versa. This is the cause of the very common defect of vision known as astigmatism (q.v.), which may require specially ground glasses for its correction. *See* Conjunctivitis; Eye; Keratitis; Pterygium; Spectacles.

CORPULENCE. *See* Obesity.

CORROSIVE. Substances which destroy tissues with which they come into contact are called corrosives. *See* Caustic; Poisoning.

CORROSIVE SUBLIMATE. This is the name of a compound of mercury, technically known as perchloride of mercury. It is of very great importance, since it is an exceedingly powerful antiseptic, and very cheap. A solution of it in water to an extent of one part in 4,000 is a thoroughly trustworthy antiseptic for almost all purposes. It possesses the disadvantage that it spoils steel instruments if used to disinfect them.

It is also used internally in exceedingly minute doses for the general purposes of mercury ; in large doses it is a most dangerous poison, producing intense irritation of the alimentary canal, severe pain, vomiting and diarrhoea. The symptoms have a considerable resemblance to those of cholera. If a quantity of a solution of this salt is swallowed by mistake the best antidote is white of egg, which, if swallowed immediately and then followed by an emetic, may avert ill consequences. The white of egg combines with the poison and renders it harmless. *See* Antiseptic ; Mercury ; Poisoning.

COTTON WOOL. The soft substance known as cotton wool is made from the hairs surrounding the seeds of the cotton plant, and contains no wool whatever in the ordinary sense of the word. When the oil which is naturally present is removed, the cotton wool becomes very absorbent, and is capable of picking up a large quantity of fluid.

Absorbent cotton wool is used largely in surgery. It is an important dressing, as it readily absorbs discharges of all sorts, and it protects injured parts from cold or pressure. It affords a much cleaner and safer means of cleansing wounds than sponges. When buying cotton wool for these purposes it is important to get the absorbent material, as a variety is sold which, although useful enough to apply to the chest, for example, is not absorbent, and so is useless as a dressing. *See* Dressing ; Gamgee Tissue.

COUGH. A cough may have a large variety of origins ; it may indicate grave disease of the lungs, for example, or be due to the pressure of wax in the ear, or to irritation elsewhere outside the breathing apparatus.

A cough is not necessarily to be regarded as an evil thing in itself. The cough of a person who has nearly choked will save his life by expelling the cause of the obstruction. The cough of bronchitis in its later stages is of the utmost importance as a means of draining the air passages ; so far as nature is concerned, it must be regarded as a proper and effective means of removing objectionable matter from the air passages.

It is important to be able to distinguish, in any particular case of coughing, between a desirable and beneficial response of nature to a particular emergency, and a painful, exhausting and useless symptom. In the first case the cough should be encouraged and facilitated in every possible way ; in the second, it should be suppressed.

The question needs careful study, because in one and the same disease there may be periods when the cough answers respectively to one and to the other of these descriptions. The cough at the beginning of bronchitis, for instance, is due to the irritation of the air passages ; there is nothing to remove, and the cough merely induces more irritation, pain and swelling. The patient must, therefore, be persuaded to control his coughing as much as possible, and must be given drugs which will tend to deaden the sensitiveness of the nerves that run to the brain from the air passages.

At a later stage, in the same case, quantities of fluid and semi-fluid are poured into his air passages from their walls, and it is imperative that these be disposed of. Hence he must be given drugs which add to the vigour of his coughing instead of relieving it. In many cases it is probably only too true that the patient has been choked in consequence of the reckless administration of drugs which have effectively relieved his cough.

The parts of the body in which the irritation may arise that expresses itself as a cough are as follows : the nose, ear, throat, gullet, larynx, windpipe, bronchi, lungs, the covering of the lung (which is called the pleura), the liver, spleen and stomach. In addition, there are certain areas of the skin, especially upon the throat and chest, irritation of which may lead to coughing. A cough may also be of purely nervous origin, as in hysteria, and also, as everyone knows, may be due to suggestion, as when a person coughs in church and other people who have no reason for coughing do likewise.

The so-called stomach cough does not occur in one per cent of the cases that usually go by that name. It is an improper thing to come to the conclusion that a cough for which no particular reason can be discovered is a stomach cough. Only too frequently it is found on examination that there are early stages of tuberculosis. A true stomach cough may be at once relieved by giving half-teaspoonful doses of bicarbonate of soda. In other cases, when the throat is attended to, the so-called stomach cough disappears, and in yet others, it is a symptom of hysteria. The term winter cough is often applied to the exacerbations of chronic bronchitis during cold, damp, wintry weather.

The treatment of a cough depends upon the discovery of its cause. The essential thing is to ascertain whether the cough is a beneficial one, or is harmful. A large number of drugs are employed for the treatment of various kinds of cough. Those which soothe the cough contain either opium or some of its constituents, such as morphia and codeine. Those which are intended to strengthen a weak cough, such as too frequently occurs in children and the aged, almost invariably contain some form of ammonia, this being by far the most powerful and rapid stimulant of the act of coughing that is known.

It must be remembered that drugs are not the only means of treatment of a cough which must be soothed. Very often the cough will cease if the air that the patient breathes be made warmer and moister than usual. In cases of cough due to the early stages of bronchitis, or of inflammation of the larynx, much benefit follows the inhalation of steam from a special inhaler, or from a kettle or teapot. To the hot water which produces the steam may be added many soothing and antiseptic drugs. One of the best, and perhaps the most popular, of these is Friar's balsam. A cough may sometimes be relieved by sucking demulcent lozenges, for example, glycerin or liquorice pastilles, or lozenges which contain menthol. Again, it may be relieved by gargling with a pinch of common salt or alum in a half glass of water. Coughing is often due to excessive cigarette smoking, and ceases when cigarettes are given up or much reduced.

In the case of children suffering from very grave bronchitis, where so much foreign matter is poured into the air passages that death by suffocation is threatened, relief may often be obtained by administering drugs which do not directly affect the act of coughing but which produce vomiting, such as a teaspoonful of ipecacuanha wine, repeated if necessary. This is usually accompanied by coughing, and in addition is probably also accompanied by movements of the muscular tissue that surrounds the air passages, in such a fashion as to empty them.

The application of poultices, mustard plasters, or other counter-irritants to the lungs is another method of relieving cough due to chest affections. *See* Atomiser ; Balsam ; Barking Cough ; Bronchitis ; Consumption ; Counter-irritation ; Croup ; Expectoration ; Hysteria ; Whooping-cough, etc.

COUGH MIXTURE. It is always necessary to understand the exact cause of a cough and to appreciate whether it is beneficial or not, before prescribing or taking a cough mixture. For winter cough, the cough which troubles elderly people in cold and damp weather, the following is often of service :

Ammonium chloride	120 grains
Compound tincture of camphor	4 drachms
Liquid extract of liquorice	2 drachms
Glycerin	4 drachms
Chloroform water	to 6 ounces

A tablespoonful every four hours in a wineglass of water.

See Anise ; Balsam ; Cough.

COUNTER-IRRITATION. Deliberate irritation of the skin in order to produce an effect upon some organ that lies beneath it is known as counter-irritation. The familiar instance is rubbing the chest of a child with camphorated oil in order to relieve a slight cold. There is here a condition of deep-seated congestion, and by way of curing it an application is made to the skin over the part involved irritating enough to redden it. Severe counter-irritation may cause actual blistering or destruction of the skin. Counter-irritation is applicable to all parts of the body, to acute and to chronic cases, and to diseased conditions of many kinds. *See* Blister ; Cantharides ; Cautery ; Liniment ; Mustard.

COWPOX. There is reason to believe that the disease known as cowpox or vaccinia, in which vesicles or blisters appear on the udder and teats of the animal, is essentially the same disease as smallpox. Cowpox is a relatively mild disease, however. The lymph used to communicate the disease to human subjects is taken from the vesicles on calves, and is treated with glycerin before being put up for use. *See* Vaccination.

CRAMP. An involuntary contraction or spasm of a muscular tissue in any part of the body is known as cramp. Sometimes the name is confined to the muscles over which we usually have control, such as the ordinary muscles of the limbs: whilst the term colic is applied to spasms of the muscles in the interior of the body, over which we have no control, and of the action of which we are usually unconscious. The commonest instance of cramp is that which occurs in the calf of the leg, particularly when one is asleep in bed.

The patient can almost always be relieved very quickly if the proper measures are taken. As a general rule, a muscle which is in a state of uncontrollable spasm will relax if the part of the body is so bent that the muscle has not to be on the stretch. Therefore, the first thing to do in cramp of the calf is forcibly to bend the knee to its utmost, so that the muscles are relaxed as far as possible. When this has been done, rub the part vigorously, and more in an upward than in a downward direction.

A tendency to cramp at night is associated with flatulent indigestion, and it may be found of some use to take a teaspoonful of sal volatile in a little water before going to bed. Other measures should be adopted at the same time to cure the dyspepsia. On the other hand, cramps sometimes occur in muscles that are not sufficiently nourished with blood. They are very common in the legs of bloodless girls at night, and in this case the treatment is to increase the amount of blood that goes to the limbs. This can be done by getting out of bed and standing up, not forgetting to keep the feet warm.

Cramp in the stomach gives rise to very intense pain. A hot-water bottle, a mustard plaster or a poultice should be applied over the stomach, and half a teaspoonful of bicarbonate of soda should be given in a little soda water, or in peppermint water if this is at hand. Ginger or any other carminative (q.v.) would also be useful. *See* Colic; Muscle; Writer's Cramp.

CRANIUM. *See* Skull.

CREAM OF TARTAR. The bitartrate of potassium, commonly known as cream of tartar, is given in doses up to half an ounce as a purgative. It may be taken dissolved with water or mixed with marmalade. A form of Imperial drink can be made by adding cream of tartar, in the proportion of a teaspoonful to the pint, to home-made lemonade. This is used as a beverage in fevers. *See* Beverages.

CREOSOTE. Creosote is a colourless or pale yellow liquid, with a penetrating odour, which is obtained from wood-tar. It is a powerful antiseptic and has been much used in the treatment of pulmonary tuberculosis. The dose is 1 to 5 minims, and it is given in capsules, in a mixture, or in cod-liver oil. It is also administered by sprinkling it on the sponge of an inhaler, and when thus used may relieve an irritating cough. It corrects gastric fermentation. From creosote may be obtained guaiacol (q.v.), which is also used for tuberculosis.

CRESOL. Obtained from coal tar, cresol is a light brown liquid which is much used as an antiseptic and disinfectant. It is used to prepare the liquor cresolis saponatus which resembles lysol and is used in the same way. To make an antiseptic solution, add one or two teaspoonfuls of either of these to a pint of hot water and mix thoroughly. Vaporised cresol is sometimes used to lessen the severity of whooping-cough, by impregnating the air with the drug. This can be done by heating a large metal spoon, or something of the kind, in the fire and then pouring on it a teaspoonful of cresol ; or a vaporiser for the purpose may be bought. In poisoning by cresol water should not be given, but white of egg, oil or butter.

CRETINISM. A number of glands in the body have no duct whereby they can get rid of the substances they manufacture and these are poured directly into the blood stream. The thyroid gland, which is situated in the neck below the Adam's apple, is one of those glands, and its secretion has a marked influence upon growth. This was observed by noting the relation between the gland and the diseases known as cretinism and myxoedema.

If a child is born with the gland undeveloped, or if it degenerates before the period of puberty, cretinism results ; if, after growth has taken place, the gland becomes ineffective, there occur mental and bodily degenerative changes to which the name myxoedema has been applied. A cretin child is distinguished by the fact that it does not grow ; it has a protuberant belly ; the face is large, the lips are thick, and the tongue appears too large for the mouth and may protrude between the lips. The hair is coarse and scanty. As for mental development, such children are imbecile or idiots.

If, however, the defect of thyroid secretion is made good by feeding the child with thyroid glands from the lower animals, say, the sheep, or with extracts of these glands, a wonderful change takes place. Growth begins and proceeds briskly ; in five or six months the child may add as many inches to its stature ; the other physical abnormalities disappear, the hair grows normally, and the child assumes ordinary mental capacity, except that, of course, it is backward for its age. But it is now capable of education.

Treatment of this kind must be commenced early. As thyroid substance is such a powerful remedy, it is necessary that the treatment should be controlled by a doctor. An excessive amount of thyroid activity causes Grave's disease or exophthalmic goitre. *See* Endocrine ; Exophthalmic Goitre ; Myxoedema ; Thyroid Gland.

CRICK. A sudden painful stiffness somewhere in the neck or back is popularly described as a crick. It is probably due in most instances to muscular spasm. Relief will be obtained by gently rubbing the part with the tips of the fingers, using some warm oil or a liniment. *See* Cramp.

CRIPPLE. *See* Deformity.

CROTON OIL. Croton oil is an exceedingly powerful drug which is occasionally used when a very active purgative is required. It is far too powerful for ordinary use, and must be very carefully distinguished from castor oil, for the seeds that yield the oil in the two cases are very similar and have occasionally been mistaken for one another, with disastrous results. Whereas the dose of castor oil is almost indefinite, one ounce, for instance, being a quite sufficient and harmless dose, the utmost quantity of croton oil that should ever be given at one time is one drop.

Obviously, this drug has the advantage that since its effective dose is so small in bulk it can easily be administered to unconscious or insane patients; for if the drop is placed on the back of the tongue it has to be swallowed. A dose of croton oil should never be repeated; the drug is exceedingly irritant, and must never on any account be administered when there is any kind of disease of any part of the bowel, but only in cases of simple obstinate constipation. *See* Cathartic.

CROSS-EYED. *See* Squint.

CROUP. The term croup has the same significance as croak, and has been applied to conditions characterised by a cough with a croaking quality about it. Associated with such a cough there may be huskiness or even loss of voice, and perhaps stridor or crowing, which is a peculiar, sharp vibratory sound heard when the patient inhales. As in these circumstances there is obviously interference with the free supply of air to the lungs, the face becomes dusky.

Attacks of croup may affect children suddenly during the night. Under treatment the difficulty of breathing passes off and they fall asleep, to awake perhaps well, or perhaps still somewhat hoarse and with a croupy cough. The attacks of difficulty of breathing may recur on one or more successive nights before finally disappearing. Such a condition of things occurs when there is inflammation in the larynx and voice-box, and in addition some spasm of the vocal cords. Very frequently the child suffers from adenoids and enlarged tonsils, and these must be got rid of when there is a tendency to croup of this kind.

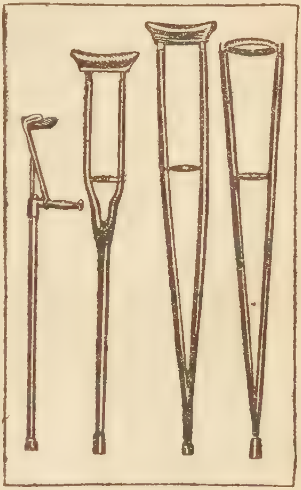
There is another condition in which sudden difficulty of breathing may cause children to start up in bed. It usually affects those who suffer from rickets. It is due simply to spasm of the vocal cords, and commonly spasms occur elsewhere as, for example, at the wrists. The child holds its breath to such an extent that it tends to become black in the face; then it takes a breath accompanied by the peculiar sound known as stridor. The attack then passes off, as a rule, and the child goes to sleep.

But while difficulty in breathing, a croupy cough and stridor may be due to the foregoing causes, the first thing that should be thought of is diphtheria, in which the symptoms are caused not only by inflammation and perhaps spasm, but by the presence of membrane in the larynx which may block the air passage mechanically, and quickly suffocate the patient. In cases of croup the doctor should therefore be summoned immediately, and, in sending for him, it would be wise to let him know the nature of the emergency.

Meanwhile, a tent should be rigged up over the patient's bed with sheets on a clothes'-horse or over ropes, and steam from a bronchitis kettle should be let into the tent. While these arrangements are being made the child should be put into a hot bath to which two tablespoonfuls of mustard have been added, and kept there for a few minutes. It is then taken out, put to bed, and a hot fomentation applied to the throat. Care should be taken that the steam from the kettle is not delivered too near to the child's face. If the difficulty of breathing persists, vomiting should be induced by giving a teaspoonful of ipecacuanha wine, if this can be got quickly. *See* Bronchitis Kettle; Diphtheria; Rickets.

CROWING. *See* Stridor.

CRUTCH. A crutch used to assist an invalid in walking should be as light as possible consistent with strength. Care must be taken that the head of the crutch does not press too much, or for too long a time, on the armpit, otherwise the nerves going to the upper limb may be damaged, and cause what is called crutch paralysis (*see* illustration in page 56). The nerve most frequently injured is the musculo-spiral, and one of the effects is wrist drop.


CRUTCH. Four different shapes

The pressure may be taken off to some extent by having a bifurcated crutch with a cross-piece for the hand grip, or a spring apparatus may be fixed to the head of the crutch. A modified crutch is made which does not come higher than the middle of the upper arm, where it is fixed by a horseshoe-shaped metal spring. A pair of these is generally used.

CUPPING. In congestive disorders of the lungs, the kidneys or other parts, much relief may be obtained by the operation of cupping. The cups are made of thick glass, and when applied to the skin the air within them is reduced, so that the skin swells up within the glass and becomes dark in colour from the blood with which it becomes engorged. Six or eight cups may be applied.

The method almost universally carried out is to moisten the inside of the cup with methylated spirit and to set this alight. The cup is immediately and accurately applied to the skin, and the flame is thus extinguished and a partial vacuum is created.

This is called dry cupping because the blood is only drawn to the surface, but if it is desired to draw off blood by wet cupping, as soon as the skin has been properly drawn up into the cup the latter is removed, and a number of small incisions are made on the skin by an instrument known as a scarificator. The cups are then reapplied as before and soon become filled with blood. Wet cupping may be used instead of bleeding by venesection, and when the heart is finding difficulty in pumping the volume of blood along, its work may be thus lessened. *See* Bleeding.

CURD. *See* Casein.

CURETTAGE. The operation in which diseased tissues are scraped away by an instrument known as the curette, is technically known as curettage. It is employed in diseases of the womb and other disorders.

CURVATURE OF THE SPINE. *See* Backbone ; Pott's Disease ; Spinal Curvature.

CUT. Small simple cuts are best treated by dabbing tincture of iodine over them. There is some smarting, but this is momentary, and the iodine helps in arresting bleeding, and is also a powerful antiseptic. The wound is then dressed with boracic lint or a clean cotton or linen rag.

When a cut is larger and deeper, bleeding may be considerable, and the first thing to do is to arrest this, a finger being pressed on the bleeding point while a pad of some clean material is being prepared. The wound may then be washed gently with water which has been boiled and then cooled, or with boracic or some other antiseptic lotion. In the case of a severe cut, a doctor may stitch the skin edges together or use strips of plaster for this purpose. *See* Adhesive Plaster ; Antiseptic ; Bleeding ; Collodion ; Wound.

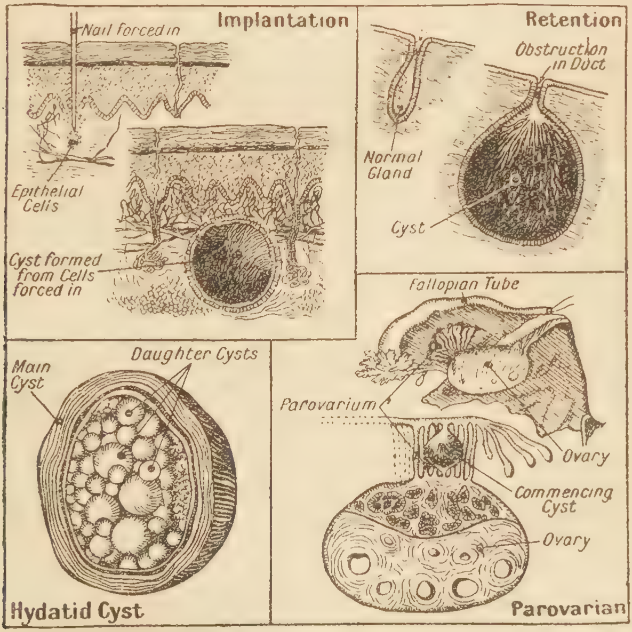
CYANOSIS. The literal meaning of cyanosis is blueness, and the term is applied to the blue or purple discoloration of the skin and mucous membranes which is due to defective aeration of the blood. The whole surface of the body may be affected, but the word may also be applied to a state of affairs sometimes seen in the fingers and ear tips, and elsewhere, as the result of interference of the circulation by cold. Where there is general cyanosis of a slight degree the condition is most easily observed on the finger nails and lips, but when of greater degree it is plainly visible on the face and elsewhere. Such general discoloration may occur in many disorders. It is common, of course, in respiratory and heart diseases.

The condition may be met with in poisoning by benzol, nitrobenzol, opium and other drugs ; and apparently poisons capable of producing it can be manufactured in the intestinal canal of the patient himself. Treatment must be directed to the underlying cause. *See* Asphyxia ; Raynaud's Disease.

CYCLITIS. The ciliary body of the eye lies behind the iris or movable curtain at its outer circumference, the two structures being continuous. Inflammation of the ciliary body, known as cyclitis, is usually associated, therefore, with that of the iris also, when the condition is called irido-cyclitis.

Cyclitis is a very serious malady, and if it persists blindness in the eye will probably result. In addition to this, its existence in one eye may lead to its appearance in the other also, more especially if the cyclitis is due to a penetrating wound of the eye, and if a foreign body is retained in the eye. Among the symptoms of cyclitis is a pink zone of congestion just outside, and all round the cornea or clear part of the eye. There is pain in the eye which is also tender to pressure. Pain may be felt in the forehead. Vision is more or less dimmed. *See* Eye ; Ophthalmia.

CYST. The term cyst is derived from a Greek word meaning a pouch, and is applied to swellings which may occur in many parts of the body, and which are essentially bags with more or


Implantation
Nail forced in
Epithelial Cells
Cyst formed from Cells forced in
Retention
Obstruction in Duct
Normal Gland
Cyst
Fallopian Tube
Main Cyst
Daughter Cysts
Hydatid Cyst
Parovarium
Ovary
Commencing Cyst
Ovary
Parovarian

CYST. Diagram showing the causes of four varieties of this swelling less fluid contents. They may be quite minute, or, on the other hand, may grow to an enormous size, as in the case of ovarian cysts. They may form in pre-existing spaces, or, again, where there is no such space.

To the first type belong what are known as retention cysts. When the duct of a secreting gland is blocked, the secretion may accumulate behind the obstruction and give rise to a retention cyst. The common wen or sebaceous cyst which is often seen on the scalp is an instance of this. Here the duct of one of the sebaceous glands is blocked, and the cyst is found to contain soft cheesy material, which represents the oily secretion of the gland in a concentrated state.

A cyst which forms at the site of a bleeding into the tissues or round a foreign body, is an instance of one forming apart from a pre-existing space. Dermoid cysts are curious structures which often contain hairs, teeth, nails and the like. They arise from cells similar to those which produce such structures, but which, having been misplaced in the developing embryo, grow out of place and out of season. Other cysts also arise from embryonic structures. Cysts are often found in the liver and elsewhere in the body which are produced by the hydatid worm, which lives in the intestine of dogs, and these may be of large size.

The treatment of a cyst depends upon its nature, its size, its position and other considerations. Many may be left alone, but others must be removed, and it is usually necessary when doing this to take away all or, at any rate, most of the cyst wall in order to prevent a recurrence of the cyst. *See* Wen.

CYSTITIS. This is the technical name for inflammation of the bladder (q.v.).

DAMP. In certain people damp is capable indirectly of causing disease. How it acts no one knows, but it must be remembered that the skin is constantly losing moisture to the atmosphere, as also are the lungs in the act of breathing. This is a necessary function of the body, enabling a quantity of water constantly to circulate through it, so as to keep it clean and free from impurities, in addition to the heat-regulating function of perspiration.

The presence of much damp in the atmosphere very much reduces the speed at which the skin and lungs are able to rid themselves of water vapour, and the interference with this function may particularly account for the bad influence of damp on certain people. Further, it is to be noted that damp probably favours the growth of microbes. But it is probable that most of the harm done by damp is due rather to cold than to the moisture itself. Rheumatism and chest complaints are notably affected by cold and damp.

In selecting a climate for those with chronic bronchial complaints it will generally be found that if the cough is dry or accompanied only by a scanty sputum, residence in a moist warm climate such as one finds at Torquay, Madeira or Algiers, is likely to be suitable, whereas if the sputum is profuse, a dry, warm climate should be chosen. *See* Cold; Fog; Humidity.

DANDRUFF. Scurf or dandruff consists of a great accumulation of dead matter, once living cells, which has been cast off from the surface of the scalp. It is an exceedingly common symptom of defect of health in the scalp. The technical name for this condition is pityriasis simplex, or alba capitis. Occasionally the disorder may go considerably further, and pass into an unmistakable inflammation of the scalp, and perhaps there may also be red, scaly patches on the forehead and face; but as a rule the production of dandruff continues in its slow and inconspicuous fashion for months and often for years, without any further change taking place, except that the hair gradually tends to become thinner.

There is no doubt at all that microbes are involved. The best remedy would appear to be sulphur, and this can be applied in several ways. It may be used in a sulphur soap, made by a reputable maker, with which the scalp is washed two or three times a week. Instead of this an ointment may be used, of which the following is a good example:

Precipitated sulphur	30 grains
Salicyclic acid	10 grains
Soft paraffin	1 ounce

This must be rubbed into the roots of the hair, as thoroughly as possible, with the tips of the fingers. In order to go properly over the scalp it has been suggested that a quarter of the area should be covered each day, and that the head should be washed on the evening of the fifth day. The ointment is then resumed and the routine followed for as long as may be necessary. If there is any difficulty in removing the scales, the head should be thoroughly shampooed with tincture of green soap, after which it must be rinsed with several changes of water.

It is important to remember that the dandruff scales falling on other parts may give rise to inflammation there. *See* Acne; Baldness; Dermatitis; Seborrhoea.

DEAF-MUTISM. Persons who are deaf and dumb are commonly referred to in scientific works as deaf-mutes. It would appear that about one-half of the total number of these patients are deaf from birth, whilst the remainder acquire their deafness in consequence of certain diseases. Of these the chief are inflammation of the covering of the brain, scarlet fever and measles. A very large number of cases of deaf-mutism due to the two latter diseases might have been entirely prevented. If a child born with good hearing becomes deaf before the age of four it will be a deaf-mute, and there is a danger of this happening to any child becoming deaf before the age of eight unless painstaking efforts are made to keep it talking.

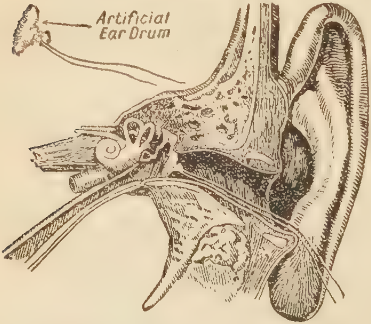
The other most important aspect of this question, in relation to the prevention of deaf-mutism, is concerned with the inheritance of congenital deafness, that is to say, deafness from birth. It must most positively be laid down that it is an improper thing for persons afflicted with congenital deafness to marry.

Prevention of deaf-mutism is thus of paramount importance, but there remains to be considered the mitigation of the lot of patients in whom this defect is already present. Very little can be done by way of absolutely curing these cases; surgical treatment of the ear and of the throat may be of some service, but it does not count for much. These children, however, can be taught to understand a spoken language and, although there is much more difficulty about this, to reproduce it in a curious monotonous speech by means of lip-reading (Plate 21).

This method of enabling deaf-mutes to communicate with their neighbours is called the oral method, and in those cases where it succeeds it is of far more use to the patient than what may be called the finger method. If it fails, however, there always remains what is called the deaf and dumb alphabet, which is easy to learn and understand.

DEAFNESS. Deafness may be due to many different causes, but, in general, there are two kinds of deafness, which are fundamentally distinct in their cause, their character and their possibilities of treatment. One kind is what is called nerve-deafness and is due to some defect in the nerve of hearing or in the brain. In general these cases derive very little benefit from treatment.

In contra-distinction to these cases are those of what is called obstructive deafness. Here the whole nerve apparatus of hearing is intact, and the difficulty lies in the fact that the sound is imperfectly conveyed to it. A large number of different disorders causing deafness may be found in the extremely complicated apparatus designed for conducting sound from without to the nerve of hearing; but nevertheless these cases are distinguished from the others by the fact that in very many instances they are capable of successful treatment.



DEAFNESS. Artificial ear drum consisting of a small ball of cotton wool

Sometimes this may be simply treatment for the relief of a mild inflammation, such as applying counter-irritation in the form of a blister behind the ear, or the use of antiseptic washes; in other cases it may be necessary to perform a surgical operation, which may vary in degree from the simple removal of a small portion of dead bone to an extensive operation involving the whole of the middle ear. Merely temporary deafness may be due to wax in the ear, and this can be cured by means of careful syringing.

There are many different aids to hearing, some of which are of considerable use, others of doubtful utility. Among them may be mentioned: (1) Artificial ear drums; a patient can provide these for himself by making a little ball of cottonwool, tying a thread firmly to it, dipping it into collodion and, when this is dry, putting it into the ear in the position in which he hears best. (2) An apparatus for conveying sounds through the bone. (3) Electrical apparatus on the principle of the telephone. (4) Ear trumpets and tubes.

It may be that hearing is improved by aids such as these, but even then, and certainly in cases where hearing will progressively become worse, the patient should seek out a teacher of lip-reading and earnestly endeavour to acquire the art. Tests for deafness are considered under the heading Hearing. *See* Ear; Eustachian Tube; Hearing; Noises in the Ear.

DEATH. The signs of death constitute a subject of great importance, to which a great deal of attention has been paid, especially from the medico-legal point of view. It is only in a very small percentage of cases of death that any difficulty or doubt is likely to arise; but nevertheless cases of this kind are quite frequent enough to demand very careful inquiry. The bodily states which most closely resemble death are extreme cases of what we call fainting, cases of asphyxia and cases of trance or catalepsy.

The following are the principal signs of death:

(1) The action of the heart and the breathing must have absolutely ceased; it is not sufficient that there is no pulse to be felt at the wrist, or that the chest becomes motionless. The heart itself must be listened to by a skilled ear for a few minutes in absolute quietness so as to make certain that it is motionless; similarly, the faintest signs of breathing must be tested by noting whether a cold mirror held before the face is dimmed, or whether a piece of cotton fluff is moved to and fro.

(2) A short time after death the muscles of the body undergo a curious change; they become stiff, owing to the solidifying of the fluids within them. This change is known as rigor mortis, that is to say, rigidity of death. The time at which it comes on and during which it lasts varies very much in different cases; on the average it begins in about six hours and lasts for twenty-four.

(3) After death the body begins to cool and is usually quite cold in less than twenty hours.

(4) The eyes very quickly lose their brightness after death.

(5) The skin undergoes changes after death. It ceases to be elastic. First of all very pale, it afterwards becomes discoloured in its lowest parts, varying according to the position in which the body lies. This is due to the fact that the blood, under the action

of gravitation, naturally sinks to the lowest possible points, and so these points are stained with blood. This discoloration appears usually in from eight to twelve hours.

(6) Finally, the body undergoes changes of putrefaction. This is an absolutely infallible test.

DEBILITY. There are so many and such varied causes for the sense of weakness sometimes referred to as debility, that it is a mistake, and sometimes a dangerous one, to label such symptoms as debility without consulting a doctor as to the probable cause. In different individuals, who find themselves debilitated, the cause may be anaemia, indigestion, constipation, chronic kidney disease, or a malignant growth, to mention only a few of the possibilities. It is obviously wrong, therefore, for a person to make prolonged attempts to pull up his strength by taking tonics, stimulants, extra feeding, changes of air and so on, until the real nature of his condition is understood. Apart from such definite causes, it is certainly the case that large numbers of people are kept in a more or less debilitated state by bad ventilation, insufficient exercise in the open-air, improper and insufficient feeding, and the abuse of tea, alcohol and tobacco. *See* Anaemia; Consumption; Diet; Exercise; Food; Health; Indigestion; Ventilation.

DECLINE. *See* Consumption.

DEFORMITY. A lack of the normal shapeliness of the body or its members may exist at birth, and may then represent some inherited peculiarity or be due to some accidental occurrences affecting the development of the child. An excessive number of fingers or toes is an example of the former, and to the latter class belong those errors of development like hare-lip or spina bifida.

Congenital club foot may be due to the foot having been crushed into and retained in a bad position before birth. Deformities arising after birth may be the results of injuries, as, for example, when a fractured bone has united in a bad position, or when the parts are dragged on by extensive scarring following burns; or they may be due to disease in the deformed part, as where angular curvature follows tubercular disease of the spine.

Deformities quite frequently result from nervous diseases, in which, owing to paralysis of one set of muscles, the influence of gravity and the action of the opposing set of muscles drag the part into an abnormal position. Instances of this occur in infantile paralysis and other nervous disorders.

DEGENERATION. In connexion with the various organs and tissues of the body, fatty, amyloid, hyaline, or some other form of degeneration may occur. What is meant by this is that the living, functioning substance of the tissues becomes replaced by a new material which is quite inert, the result being that the tissue ceases to perform its duties according to the extent to which the change has taken place. A liver cell, for example, which in the ordinary course stores up sugar, manufactures bile, destroys poisonous substances coming to it in the blood, and so on, can do none of these things if its protoplasm is replaced by fat or by amyloid substance.

There are numerous causes of such degeneration. A general fatty degeneration throughout the body may occur in certain fevers, in poisoning by phosphorus or arsenic, or other poisons, and in the disease known as acute yellow atrophy of the liver. The liver, the kidneys and the heart muscle are the parts more particularly affected. That is an instance of degeneration from toxic or poisonous influences. To deprive a tissue of its nourishment by cutting off the blood supply is another way in which degeneration may be brought about. The softening of the brain which occurs when one of the brain arteries is blocked is an instance of fatty degeneration, and this may occur also in tumours which grow too fast to provide themselves with a sufficiency of blood vessels to carry on the circulation within them. In amyloid, also known as waxy and lardaceous degeneration, a heavy, translucent material replaces the normal tissue. *See* Kidney; Liver; Nervous System, etc.

DELIRIUM. The mental excitement and disorder which may occur in the course of high fevers, certain brain diseases and in a variety of other circumstances, is spoken of as delirium. A delirious person may see people, animals or things which have no existence, or his imagination may distort objects within his view into something quite different, and confuse the identity of people. He may entertain suspicions of someone in attendance on him poisoning his food, of being in league with his enemies, or of something else of the kind, and in consequence of this he may attempt violence or may try to make his escape from the room.

The onset of delirium in feverish disorders may be preceded by a certain amount of confusion of ideas, shown when the patient first wakens out of sleep; it may, however, come on quite suddenly. It therefore behoves all those in charge of cases of pneumonia, of enteric fever, or of any other high fever, to mark well any indications pointing to mental confusion; and when active delirium has developed, the patient should never be left for a moment unobserved. The treatment of delirium will be controlled, of course, by the doctor, but the application of an ice-bag or of iced cloths to the head, sponging the body and limbs with cold water, or the application of a cold pack, are measures which may prove very useful. The patient must also be humoured as far as possible.

There is another sort of delirium which sometimes occurs towards the end of fevers or other serious illnesses. It is what is called low, muttering delirium. The patient lies with his eyes half open, but is unconscious. He keeps on muttering to himself, and his hands may be active, picking at the bedclothes, or as if catching flies in the air. In this condition the fires of life and energy are burning very low. Care must be taken to maintain warmth as far as possible by watching the temperature of the room, and by the use of hot-water bottles in the bed. A little whisky or brandy, if the doctor so orders, is often of great use at this time. *See* Fever.

DELIRIUM TREMENS. Delirium tremens, which literally means trembling delirium, is a name given to a very distinct form of alcoholism. For the time being the patient is undoubtedly insane; this condition is not due to the direct action of alcohol, otherwise, of course, it would be far more common even than it is, but to changes in the brain produced by the prolonged abuse of alcohol. It may occur in a patient who has never been drunk. The attack comes on often in consequence of some extra strain thrown upon the brain, such as an accident, some acute illness, or an exceptional amount of drinking.

As the name implies, trembling (especially of the limbs and fingers) is a marked symptom; the patient becomes sleepless and loses his appetite, then his mind goes, he becomes the subject of all sorts of baseless suspicions, and is in constant terror, partly on that account, and partly because he imagines that he sees all sorts of insects and horrible creatures on his bed and all around him. The patient usually has some fever. According to circumstances, he may recover altogether, or he may die during the attack, or he may recover physically but sink into a state of permanent insanity. The kind of insanity called dementia is the natural sequel to a succession of attacks of delirium tremens.

The treatment of this disease consists mainly in attempting to support the patient's strength. This is to be done by keeping him in bed, if possible by mere persuasion, but if necessary, by force, in feeding him on a simple, digestible and nourishing diet, and in compelling him to sleep, by hypnotics if necessary; no alcohol must be used. *See* Alcohol; Delirium; Dementia; Insanity.

DEMENTIA. Dementia is the general name applied to all those forms of insanity of which the chief characteristic is not perversion of the mind or alteration of it in any particular direction, but simply loss of mind. A progressive mindlessness, or dementia, is, so to speak, a normal symptom of extreme old age, but often occurs far sooner than it should, and often apparently is simply an effect of decay. In other cases, however, there is some brain disorder to account for it, a haemorrhage or a tumour, for example; or the brain disorder may follow on abuse of alcohol or other drugs, or occur as part of the general defect in cretinism or myxoedema.

People suffering from dementia will require care and control according to the degree of mental enfeeblement. Special causes may benefit from appropriate treatment; much benefit will be produced in cretinism and myxoedema by the administration of thyroid extract.

Dementia praecox is a name which is given to certain cases in which, perhaps after delirium with hallucinations, there is a rapid loss of mental capacity. Its onset has reference to the development which takes place during the periods of puberty and adolescence. Amongst other methods of treatment suggested for this condition is a systematic re-education of the patient. *See* Insanity ; Mental Disease.

DENTIFRICE. A substance used for cleaning the teeth is a dentifrice ; it may be a liquid, a paste or a powder. Powders and pastes by their physical nature help to rub away deposits on the teeth, but they should not be too gritty or they may injure the enamel. Camphorated chalk is a useful and inexpensive dentifrice.

DEODORANT. Substances which mask or destroy foul odours are called deodorants. The smoke of tobacco, of brown paper, or of other materials is sometimes used for this purpose, as are eau de Cologne and other perfumes. It must always be remembered that merely to cover a bad smell may in no way dispose of dangers of disease contamination from the cause of the smell, whatever that may be. *See* Antiseptics ; Disinfectant.

DEPILATORY. This is the technical name applied to any drug or measure which removes hair. A depilatory paste will remove hairs if properly used, but they will grow again in the course of a few weeks. The active drug in most of these pastes is the sulphide of barium. The following is a formula for such a paste :

Barium sulphide	2 drachms
Orris root powder	2 drachms
Starch	4 drachms

A small quantity of the powder is made into a stiff paste with a little water, and is applied to the skin from which the hairs are to be removed. It is left on about five minutes, and is then scraped off with a blunt knife. The hairs come away with the paste. As a rule there is no pain or irritation, but it is well not to leave the paste on longer than for five minutes, or it might cause irritation. The skin is washed after the paste is removed, and a little cold cream is then applied.

Other depilatory measures consist in the method of electrolysis (q.v.) and the use of Röntgen Rays. *See* Barium ; Electrolysis ; Hair ; Skin ; X-Rays.

DEPRESSION. The subject of depression is one of great difficulty and importance. The depression of mind which is due to some sufficient cause, such as a great misfortune, is hardly a matter for medical enquiry, but there is a large amount of depression which is not due to any such sufficient cause. Sometimes it occurs in cases of insanity, but depression of mind also occurs very frequently amongst persons who are not insane, and who have had no misfortune, or only such as other people would bear without difficulty. As a rule there is some bodily reason for these cases of depression. Sometimes there is positive disease; but more frequently it will be found that the patient has been abusing his body in some way, or that he has indigestion, or that his nervous system has been strained by overwork, or that he suffers from that disturbance of ideas which is called a complex.

A constant resort to stimulants such as tea and coffee, and more especially alcohol, in order to dispel depression, is greatly to be deprecated, as this will probably only aggravate the condition. The cause must be investigated. If it is overwork the patient should rest or have a change; in some cases more open-air life is needed, and so on. People who suffer from depression which their own minds tell them has no really sufficient cause, should be aware that their condition demands serious attention, for otherwise it may lead, in a certain number of cases, to permanent disorder of the mind. Psychotherapy is often of benefit in these cases. *See* Change of Life; Neurasthenia.

DERBYSHIRE NECK. *See* Goitre.

DERMATITIS. Inflammation of the skin is technically called dermatitis. The area of skin inflamed may be uniformly affected, or there may be larger or smaller patches scattered over it with sound skin intervening. The signs are those which one is accustomed to associate with inflammation, that is to say, redness, swelling, heat and pain. After exposure to the sun, for instance, the face may become red and swollen, so much so, perhaps, that the eyes almost disappear. The face feels hot and burning, and perhaps itchy. Afterwards the skin may peel and some brown pigmentation may be left.

In some cases blisters are formed; if small, these are known as vesicles, if large, as bullae. If a vesicle becomes filled with pus or matter, it is a pustule. Should any of these burst, an ulcerating surface may be left which may continue to discharge, or the discharge may dry up and form a crust or a scab. In some cases of dermatitis, papules or pimples make their appearance and may give rise to intense itching.

External irritants other than sunlight may also produce dermatitis. It may result from cold, from heat, or from over exposure to X-rays. It is common in certain occupations owing to the substances which have to be handled; for example, paraffin workers; workers amongst tar; cabinet makers; grocers, in whom it appears as grocers' itch, apparently from handling sugar; gardeners, from handling certain plants, notably some primulas and poison ivy; steelworkers, from the fine grit and from the dirty tubs in which tools are washed. The importance of recognizing the cause of the dermatitis in the case of paraffin and tar workers is that if the irritation be allowed to operate for a long time, cancerous disease of the skin may be produced.

Poisonous substances in the blood may also cause dermatitis. The nature of some of these poisons is obscure, but often a clear connexion can be shown between dermatitis and some drug which has been introduced into the body. Arsenic, bromides and iodides are instances of such.

The prevention of what are called the occupational forms of dermatitis is clearly a matter of great importance. In every case scrupulous cleanliness should be practised, and this would do much towards prevention. In some cases it may be possible to use gloves or something of the kind when handling irritating substances.

The treatment adopted for dermatitis will vary according to its severity and its cause. In some cases, as where the cause is a drug, merely to discontinue this may be quite sufficient. Where there is heat and itching a sedative may be applied. This may take the form of a lotion, for example, calamine lotion ; of a dusting powder, such as one made up of 1 part of zinc oxide, 1 part of boracic acid, and 8 parts of starch powder ; or of some emollient, like vaseline, lanoline, cold cream or zinc ointment.

The reddish or salmon-pink scaly patches which sometimes appear on the back, the chest, the brow or elsewhere, and usually when the patient is subject to dandruff, are sometimes called seborrhoeic dermatitis, and are due to a microbe. Such patches will disappear quickly, as a rule, under an ointment such as this :

Salicylic acid	10 grains
Precipitated sulphur	10 grains
Powdered zinc oxide	1 drachm
White vaseline .. .. to make	1 ounce

The dandruff (q.v.) should always be attended to.

Dermatitis occurs of course in most skin diseases, but where there are special features the disease is given a special name as, for example, eczema, erysipelas, psoriasis, herpes, and so on. *See* Lotion ; Occupational Disease ; Ointment ; Pemphigus ; Skin.

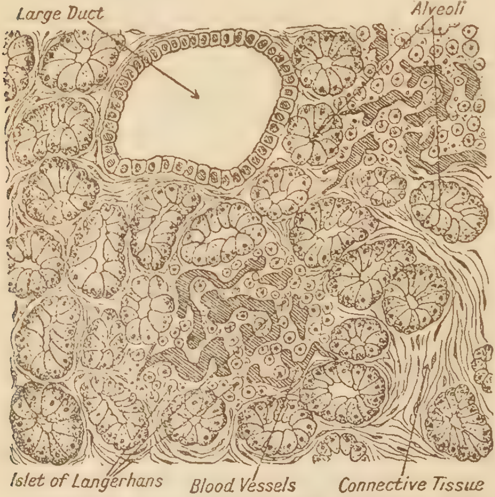
DESQUAMATION. Derived from the Latin word squama, a scale, desquamation is a word used to describe a condition that follows some diseases, the most striking of which is scarlet fever. The outer skin is more rapidly shed than at other times, and comes off in the form of a multitude of tiny scales. In scarlet fever large flakes may peel off. It is now held by authorities that desquamation is relatively unimportant. *See* Scarlatina.

DEVONSHIRE COLIC. At one time colic due to lead poisoning was frequently caused by drinking cider. From this arose a custom of calling chronic lead poisoning Devonshire colic. Nothing of the kind need be anticipated from cider nowadays. *See* Lead.

DIABETES INSIPIDUS. This is a rare and very peculiar disease, the one distinctive symptom of which is the persistent production of an extremely excessive quantity of urine. Naturally accompanying this symptom is a persistent and excessive thirst. The disease is not in itself fatal, but may be accompanied by damage to the kidneys, and there is a tendency to contract disease of the lungs sooner or later. Treatment by injections of pituitary extract usually produces at least temporary release from symptoms. The patient must be kept warm and should avoid fatigue. He should restrict the fluids taken so far as this can be done comfortably.

DIABETES MELLITUS. Generally referred to simply as diabetes, this disease is quite distinct from diabetes insipidus described above, is far commoner and of much greater importance. In this, as in the other form, there is a great excess in the amount of urine passed, but here the resemblance between the two diseases ends. In diabetes mellitus, or true diabetes, the almost constant fact is that, apart from treatment, the urine contains a certain amount of sugar; whereas there is no sugar in normal urine.

It is believed that the disease is generally due to damage affecting the pancreas, the gland which lies near the stomach and which is so important in digestion (q.v.); but it is not the part of the pancreas concerned with digestion which has to do with diabetes, but rather the little collections of cells which are embedded in the gland proper. These are known as the insulae or islets of Langerhans, and they appear to produce a secretion which they pour into the blood, and which has the effect of ensuring that the sugar in the body will be burnt up and utilised.



DIABETES. Section of the pancreas showing the islets of Langerhans, disease of which causes diabetes

In disease of the pancreas, affecting these islets and leading to a failure of their secretion, it is not surprising, therefore, that diabetes should occur. The truth of this view of the part played by the islets in causing diabetes is borne out by the fact that an extract made from the islets, which is well known as insulin, has the effect, if injected into the body, of removing the symptoms of diabetes.

Normally, carbohydrate food is converted into grape sugar in the intestine, absorbed as such and carried to the liver, where it is converted into and stored up as glycogen, a starch-like substance. Glycogen is stored in the muscles also. From time to time, as sugar is required in the blood, glycogen is re-converted into sugar and is passed into the blood stream. But in diabetes mellitus this scheme is upset, and carbohydrate food, and in some cases even protein food, is converted into grape sugar which is not stored up but accumulates in the blood, and is forthwith discharged into the urine.

The damage to the pancreas may arise from infection of some kind. In considering the causation of this disease, other facts must, however, be noted. It appears to be a family disease in a large number of cases. In others the symptoms have followed an injury about the base of the skull ; or excessive eating, especially of carbohydrates, over a prolonged period ; or severe grief or worry, or a nervous shock of some kind.

In consequence of the changes in the body chemistry the patient loses flesh and strength, despite his large appetite and great thirst ; he becomes thinner and thinner, and various complications may supervene. When the disease occurs in the young it is much more acute, and also more rapidly fatal. Occurring in the elderly, it is often very mild and may last for years without very markedly affecting the health of the patient. The most characteristic end of the disease is by coma. This is brought about by a poisoning of the blood, commonly called acidosis (q.v.), which results from the perverted body chemistry.

Even prior to the introduction of insulin treatment, glycosuria (the presence of sugar in the urine) in elderly people could generally be controlled by a properly adjusted diet. The first thing to be done is to find out the extent of the sugar tolerance of the patient, that is, the amount of carbohydrate which he can take without unduly raising the amount of sugar in the blood. This may be done by putting the patient on a diet of meat, eggs, green vegetables, and a limited amount of carbohydrate, for example, 4 ounces of bread daily. The amount of sugar represented in the carbohydrate given is known, and it can be judged by an examination of the urine whether it is necessary further to reduce carbohydrates or possible to increase them.

It must next be considered whether the diet reached in this way satisfies the patient's demands as laid down under the heading Diet, due regard being paid to the amount of the daily work. For many elderly people it may be found sufficient, but it is very unlikely that younger patients will be able to get on without an increase of carbohydrate. This will be made possible, however, by the daily use of insulin, the requisite number of units being injected under the skin, twice as a rule, once before the morning meal and again before the evening meal.

Care should be taken to avoid over-dosage with insulin, otherwise there occurs an undue diminution of the sugar in the blood, or hypoglycaemia. This is signalised by such symptoms as faintness, giddiness, trembling of the hands, sweating and drowsiness. These symptoms will be relieved by taking cane-sugar or glucose, and it is a useful precaution for a patient who is taking insulin to carry around with him a stick of barley-sugar. Insulin has proved of immense value in cases of diabetic coma, in which formerly the outlook was of the blackest.

For purposes of reference it may be useful to mention some of the things which may be taken by a diabetic and others which are forbidden, unless ordered by the physician. The following may be given: clear soup, tea and coffee (without milk or sugar), soda water, unsweetened lemon drinks, bread and biscuits made with almond, gluten or bran, cucumbers, celery (sparingly), tomatoes, asparagus (the green part), and all green vegetables, all kinds of fish and shellfish (except cod's liver), fresh meat (except liver), poultry, eggs and butter and all acid fruits, particularly oranges, currants and sour berries.

Diabetic bread and biscuit must be obtained from a reputable firm, and a doctor's advice should be asked with regard to any food of the kind which it is proposed to take. Saccharin may be employed in powder or tablets to sweeten tea, coffee and other beverages, and fruit or other foods which may be taken.

The following are forbidden: bread of all kinds (except such as is made for diabetics), rice, tapioca, potatoes, beets, turnips, vegetable marrows, parsnips, artichokes, all malted liquors, sweet wines, and any beverage sweetened with sugar. Milk should not be given without the doctor's sanction; it is sometimes submitted to treatment which fits it for diabetics on a carbohydrate-free diet. *See* Acidosis; Diet; Food; Pancreas; Urine.

DIACHYLON PLASTER. *See* Lead.

DIAPHORETIC. This is the name applied to any drug or other means of treatment which causes the skin to produce a quantity of sweat or perspiration. The skin is one of the organs by which the body gets rid of poisons that may have gained admission to it, or that may have been produced within it. Hence it is often desirable, for example, in cases of fever and Bright's disease, to employ some kind of diaphoretic to urge the skin to greater activity. Moreover, free perspiration helps to lower the temperature in fevers.

Sweating can sometimes be quickly induced, for example, in malaria, by wrapping the patient in a blanket, surrounding him with hot-water bottles, and giving him hot drinks. By the use of a large bed cradle and lamps, a patient may be given a hot air bath or a vapour bath in bed.

Amongst the drugs which have this effect the most commonly used are probably the solution of acetate of ammonium or mindererus solution, the dose of which is 2 to 6 drachms; sweet spirits of nitre, dose 15 to 60 minims; and Dover's powder (q.v.) which contains opium and ipecacuanha and is given in doses of 5 to 15 grains. The last named is often taken at the commencement of a cold, if the patient can go to bed. A simple diaphoretic mixture for an adult would be as follows :

Spirit of nitrous ether	3 drachms
Solution of acetate of ammonium	2 ounces
Syrup of oranges	4 drachms
Camphor water .. .. to make	8 ounces

Dose : Two tablespoonfuls every 4 hours.

Care has to be taken, after the use of any of these diaphoretic remedies, against exposure and chilling. *See* Baths ; Fever ; Sweat ; Warburg's Tincture.

DIAPHRAGM. The dome-shaped partition between the cavities of the chest and abdomen is known as the diaphragm or midriff. It consists of flat muscles at the sides and of tough membrane at the centre, and is attached to the six lower ribs, the backbone, and the lowest part of the breast bone. It is perforated by several openings for the passage of the oesophagus or gullet, the abdominal aorta or large artery supplying the lower part of the trunk and the lower limbs, the inferior vena cava or large vein returning the blood from these parts, and of other structures. *See* Abdomen ; Breathing Exercises ; Respiration.

DIARRHOEA. The frequent passage of softened motions by the bowels, which is what is meant by the term diarrhoea, should always be looked upon as a symptom, and not a disease in itself. Along with diarrhoea there may be the rumbling of gas in the bowel, and colicky pain. In some cases there is frequent and useless painful straining ; this symptom is commonly referred to as tenesmus.

The most common cause of diarrhoea is the presence in the bowel of some irritating substance. In such a case the first business of the doctor is to get rid of that substance, and therefore he gives some drug which makes the bowels act more vigorously than ever ; then, when the cause of irritation is removed, the diarrhoea ceases. On the other hand, there are many cases of diarrhoea which depend upon a diseased condition of the wall of the bowel itself. In such cases a purgative drug would make the condition worse in every way. Thus, it is clear that no one should attempt to treat any case of diarrhoea until the cause of the conditions has been ascertained.

Acute diarrhoea is exceedingly common and is most frequently caused by irritation, though in other cases it is due to chill or to nervous excitement. It should not be forgotten also that diarrhoea may usher in enteric fever, dysentery, or some such disease. Occurring in a young child in hot weather, it may constitute the fatal malady known as summer diarrhoea or infantile cholera, described under the heading Cholera.

When diarrhoea is due to something indigestible having been taken, it is best treated by giving about an ounce of castor oil to which a few drops of tincture of opium or laudanum have been added. The castor oil removes the irritating substance, and the opium soothes the angry bowel. When the diarrhoea is at all serious, the food should be confined to liquids, milk, of course, being its best ingredient. Milk should be sipped, and it may well be mixed with an equal part of warm water, soda water, or of lime water. In hot weather the milk should be boiled.

Warmth to the belly not only eases any pain there may be, but tends to diminish the diarrhoea. Another means of doing this is to rest in bed, or at any rate to lie down. If there is faintness a little spirit of sal volatile may be given in some water; but if diarrhoea is as severe as this, or if it does not respond quickly to simple remedies, a doctor should be called in. If looseness of the bowels persists after the irritating substances have been cleared away, doses of salicylate of bismuth, 10 grains, of chalk mixture, ½ to 1 ounce, or of vegetable astringents like catechu or kino, may be given every three or four hours.

After an attack of diarrhoea, the diet should be light and bland for a few days. Of this description would be milk puddings, steamed white fish, sweetbreads and chicken jelly. Stringy meat or vegetables and fruit skins must be avoided.

It is a great mistake for a patient with chronic diarrhoea to go on treating himself with diarrhoea mixtures without reference to a doctor. A very careful expert examination is required in these circumstances to determine the nature and cause of the diarrhoea, and the sooner this is done the better. *See* Astringent; Cholera; Collapse; Indigestion; Intestine; Lienteric Diarrhoea.

DIET: ITS CONSTITUENTS EXAMINED

How the Human Body is Fed and Maintained

Like a motor car, or steam engine, the human body must be supplied with fuel to make it go. The following article tells the right fuels to use to get the best results. See Banting; Carbohydrate; Digestion; Fat; Food; Protein; Vegetarianism

The essentials of a proper diet are that it should provide for growth and for the replacement of waste, that it should furnish the heat and energy required by the body, and that it should furnish also a measure of stimulation to metabolism and to the functions of the alimentary tract.

An analysis of foodstuffs shows that they are made up of certain constituents, namely, proteins or nitrogenous substances, carbohydrates, fats, salts, vitamins and water. The proteins, of which white of egg and lean meat are examples, are the tissue-builders and make good the loss of tissue due to the wear and tear of living; they also go to the making of the secretions of the body. The daily amount of tissue waste in an adult person is not very great, and hard work makes no appreciable difference, because the energy expended is derived from other kinds of foodstuffs. An increased consumption of meat, therefore, on account of harder work has no physiological justification. A growing person, on the other hand, requires a liberal allowance of proteins.

These substances are contained in flesh, fish and fowl, and also in wheat and other vegetable foods, but those of animal origin have in addition a certain dynamic quality which explains the craving for animal food in cold climates and the lessened inclination for it among dwellers in temperate climes during the hotter weather. Another advantage of flesh foods is that they present their proteins in a concentrated and easily digested form.

Proteins also furnish a certain amount of heat and energy, but the proper sources of most of our requirements of these are carbohydrates and fats. If more protein is taken than is required for growth and repair, more energy will certainly be provided, but the body will be taxed to dispose of much that is not otherwise utilised ; there will be an excess of ash, as it were, for the fuel consumed, whereas fats and carbohydrates produce no ash.

The amount of heat and incidentally of energy, as heat and energy are convertible into one another, furnished to the body by fixed amounts of protein, fat and carbohydrate, can be estimated by burning them outside the body. The amount of heat is calculated according to a unit known as a calorie or, as is usual when dealing with foodstuffs, a large, or kilogramme, calorie.

A calorie, or small calorie, is the quantity of heat required to raise the temperature of 1 gramme of water through 1° C. ; a large calorie, that required to raise the temperature of 1 kilogramme, or 1 litre, of water also through 1° C. In what follows, and elsewhere in this book, when the term calorie is used, it is the large calorie that is meant.

It has been found, then, that 1 gramme of either protein or carbohydrate produces 4 calories, while the same amount of fat produces 9 calories. The excellence of fat as a source of heat is apparent, and, for a reason to be mentioned hereafter when treating of vitamins, fat is an essential part of any diet. It might appear, then, that fat might be used altogether in place of carbohydrate, but this is not so ; the body cannot burn up fat properly unless in the presence of a relatively large amount of carbohydrate. Otherwise poisonous substances accumulate in the blood, as described under the heading Acidiosis.

From experiments it has been found that the number of calories expended and required in the 24 hours by various classes of persons are as follows :

Man doing hard muscular work	4,000 calories
Man doing moderate muscular work	3,500 calories
Man doing light muscular work	3,000 calories
Man doing sedentary work	2,500 calories
Average woman	2,500 calories
Man in bed, feeding	1,850 calories
Man in bed, fasting	1,700 calories

Different opinions have been expressed regarding the relative proportions of the three food constituents which should be represented in the diet. Two scales which have been suggested as suitable for a man doing light work, that is, requiring 3,000 calories, are as follows :

Protein	Carbohydrate	Fat	Actual Calorie value
120 grammes	500 grammes	50 grammes	3,007
100 grammes	350 grammes	100 grammes	3,090

As regards the differences, it may be said that most people could do with less protein than is commonly taken, that is, with the second scale as stated above, while with regard to the proportions of carbohydrate and fat, the former should bulk more largely as compared with fat when a rapid output of energy is required. Under the heading Food, tables of the principal articles of diet are given, from which, by the application of the facts noted above, an intelligent scheme of dieting can be produced.

The salts in foodstuffs include those of iron, calcium, magnesium, sodium, and potassium, and are necessary in tissue building or, in various ways, in the chemical processes which go on in the body ; iron is a necessary constituent of the red blood corpuscles, for example, and calcium of bone, while sodium chloride is a constituent of blood, etc., and the source of hydrochloric acid in the gastric juice.

Even should a diet be corrected, however, in all the particulars which have been mentioned up to this point, it will not be a good diet unless the foods included contain certain substances known as accessory food factors or vitamins. Several of these vitamins have been recognised, namely, three which are soluble in fat, but not in water, and known respectively as A, D and E, and three which are soluble in water and known as B, B2 and C.

Fat soluble A prevents xerophthalmia, D prevents rickets, and E has been shown to be necessary to reproduction in rats fed on an artificial diet in which A and D were present ; the absence of water-soluble B leads to beri-beri, and it is therefore also known as the anti-neuritic vitamin ; B2 prevents pellagra ; while the absence of water-soluble C leads to scurvy and it is therefore called the anti-scorbutic vitamin. It is probable that ill-defined diseases occurring in those who feed on artificial foods is explained by vitamin starvation.

Foods which contain vitamin A generally contain D also, and the statements in the table on page 253, regarding the presence and richness of vitamin A, may be taken as applying equally to vitamin D. There is very little vitamin D in green vegetables, however, and conversely the body fat of fish contains no vitamin A but a fair proportion of vitamin D, so that herrings, for example may be used as a source of the latter. What is said about vitamin B above applies more or less to vitamin B2, but milk, which does not contain the former, contains the latter and this also occurs in lean meat, fish, cheese and eggs.

Other characteristics of a good diet remain to be considered. It must excite the digestive functions and must contain a sufficient amount of indigestible material, or, as it is called, roughage, to stimulate the muscular movements of the gut and so promote regularity in the action of the bowels.

In the following table the vitamin content of various foods is set out :

Foodstuff	Fat Soluble A	Water Soluble B	Water Soluble C
Milk	+ +	—	+
Butter	+ + +	—	—
Cream	+ +	—	+?
Egg yolk	+ +	+ +	—
Beef fat	+	—	—
Mutton fat	+	—	—
Lard	+	—	—
Pork	—	—	—
White fish	—	—	—
Herring	—	—	—
Cod-liver oil	+ + +	—	—
Margarine (containing animal fat) ..	+	—	—
Vegetable oils ..	—	—	—
Wheat (whole grain) ..	+	+ +	—
White flour	—	—	—
Polished rice	—	—	—
Fresh fruit (especially orange, lemon, grape fruit, tomato) ..	—	—	+ + +
Nuts	—	+ + +	—
Green vegetables (raw)	+ +	—	+ + +
Green vegetables (cooked for a short time) ..	+ +	—	+
Potato	—	+	+
Swede turnip	—	+	+ +
Yeast	—	+ + +	—

+ + + = abundant supply ; + + = moderate supply ; + = fair supply ; — = none.

Appetite and digestion are improved by variety in the diet and by good cooking. Foods which require chewing are helpful because they allow time for the action of saliva, and the act of chewing stimulates the flow of gastric juice. Moreover, it should be recognized that chewing crisp food, such as an apple, is a natural method of cleansing the teeth, and if young children were given such foods regularly there would be much less dental cares than is encountered at present. Roughage is supplied chiefly by the cellulose contained in vegetables and fruits and stimulates the bowel mechanically. Constipation may be cured simply by taking more of such foods; on the other hand, when there is diarrhoea, foods providing roughage should be discontinued for the time being.

An excessive diet strains the digestive and excretory apparatus of the body, leading to indigestion and auto-intoxication (q.v.). Some of the excess is laid down as fat, and a flabby obesity is also the common result of an excessive consumption of carbohydrates, another result being flatulent indigestion. In some diseases, for example, diabetes mellitus, and nephritis, adjustment of the diet is the most important part of the treatment. The diet in chronic diseases varies considerably according to the nature of the disease, but often the diet is not sufficiently varied; this, perhaps, applies particularly to dyspepsia, as the patient often subjects himself to vitamin starvation by too narrow a selection of foods.

After a person has passed middle age his dietary should be reviewed frequently and the quantity should diminish pari-passu with his output of work as the years go on. Possibly, as he gets older, he may become more inclined to constipation and it will be important to have plenty of roughage in his food. For old age, food must be simple and easily digested, and, as the body heat is less easily maintained, it should contain an adequate amount of fats and carbohydrates.

DIGESTION: THE PROCESS EXPLAINED

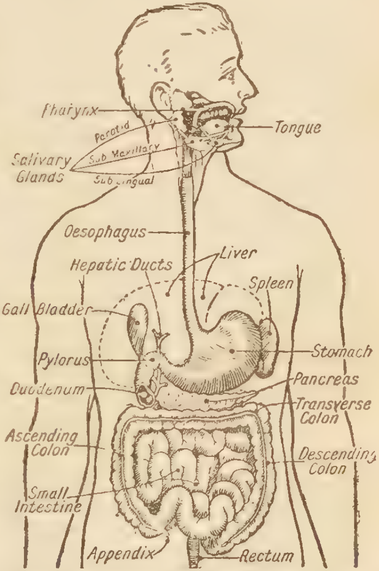
Some Facts About an Important Bodily Function

Before the various parts of the body can draw their nourishment from food, the process of digestion must take place. The following article gives valuable information concerning digestion and tells how it may be helped by eating the correct foods. See Appetite; Bile; Indigestion; Pancreas; Saliva; Stomach

Digestion is the name of the process by which the food, after it has been dealt with by the teeth, is changed in such a fashion that it can be absorbed from various points in the alimentary canal, and in this way reach the body in general.

It is a useful thing to think of the alimentary canal as a long tube that runs down the middle of the body. In a sense, therefore, anything inside that tube is not really inside the body; it must get through the walls of the tube before it is really made part of the body itself. This is an important idea, for it leads us to understand that we live, not by what we eat, but by what we digest and absorb and assimilate.

Another note must be made as to the meaning of the word indigestible. This is used in two senses. Sometimes it is used to describe substances which in the nature of the case cannot be digested; paper, for instance, is indigestible, and coal, and the fibres in cabbage stalk. There is no apparatus within the human body for reducing these things and many others to a form in which they can be absorbed; they cannot be digested, and therefore they are properly described as indigestible. But the word is often used also to describe substances which get digested by the healthy body, but which tend to upset the digestion, as the saying goes.


Pharynx
Parotid
Tongue
Salivary Glands
Sub Maxillary
Sub Lingual
Oesophagus
Liver
Hepatic Ducts
Spleen
Gall Bladder
Stomach
Pylorus
Pancreas
Duodenum
Transverse Colon
Ascending Colon
Descending Colon
Small Intestine
Appendix
Rectum

DIGESTION. Course of the alimentary canal with some of the principal accessory organs

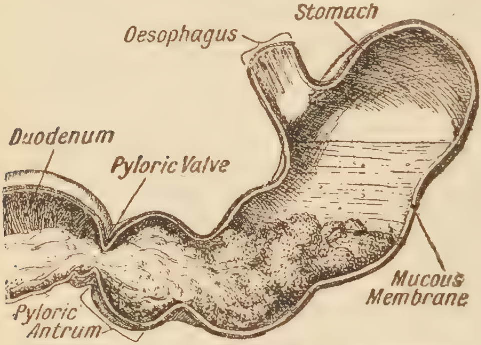
The first stage of digestion begins in the mouth. The saliva which is poured out into the mouth during the act of chewing helps not only to put the food into a convenient form for swallowing, but also contains a digestive ferment known as ptyalin, which gets thoroughly mixed up with the food if the act of chewing is properly performed and not scamped. Saliva is alkaline, and the juices of the stomach are acid, but it takes some time for the gastric secretion to penetrate the masses of food, and until this happens salivary digestion goes on.

The gastric juice has no power of dealing with the starchy elements of the food, and has only a slight action on oils and fats, except in so far as the movements of the walls of the stomach tend to mix them thoroughly with other constituents of the food and so render them more fit for treatment further on. It has, however, on proteins, which it owes to certain of its contents, notably hydrochloric acid. The function of this very important constituent of the gastric juice is to combine with and dissolve the proteins of the food, this process being a preliminary to their satisfactory digestion. Hydrochloric acid is also an antiseptic, and this property is of extreme value; it is more than probable that, were it not for this property of the gastric juice, much suffering would result from swallowing the innumerable varieties of microbes ingested with the food.

The other most important constituent of the juice is a ferment called pepsin; there is also a small quantity of another ferment called rennin, which curdles or coagulates milk.

After the first stage of gastric digestion, the hydrochloric acid combines with and dissolves the proteins of the food, and then the pepsin proceeds to digest them, that is to say, to produce chemical changes of such a character that they are able to be absorbed by the wall of the bowel at a later stage; that, and that alone, is all that digestion means. The soluble form of protein which is the product of this digestion is known as peptone.

What happens during the gastric digestion of certain common articles of diet may be briefly noted. The protein substance which is the chief constituent of milk is first of all solidified or coagulated by the rennin (the size and density of the clot that is formed markedly affects its ease of digestion); thereafter the clot is first of all dissolved by the hydrochloric acid and then half digested by the pepsin. If milk were not so coagulated it would run straight through the stomach into the bowel.



DIGESTION. Diagram to illustrate the passage of chyme from stomach to intestine

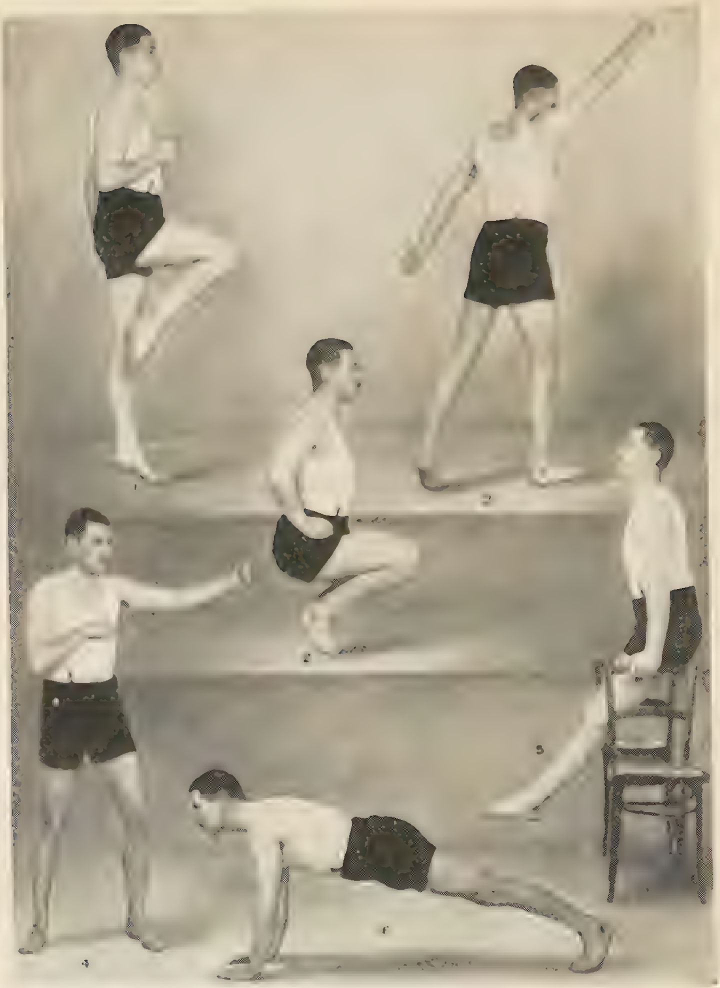
In the case of the fat cells, such as those that constitute the ordinary fat of meat, all that gastric digestion accomplishes is to dissolve the envelopes of the cells and liberate the fat, or rather the oil, which they contain. It is important to remember that fat and oil really undergo only an insignificant amount of digestion in the stomach; such substances, in fact, tend to lessen the secretion of gastric juice.

If the gastric juice is to do its work properly certain conditions must be established. The food must be palatable, it must be well masticated, it must obviously be capable of digestion by the juices of the stomach (as a great many articles of diet are not), and it must be taken at regular intervals. For successful gastric digestion there must also be absence of severe mental and muscular effort.

But this account of gastric digestion would be very incomplete if no mention were made of another function of the stomach, not a digestive function in one sense, but nevertheless a most important aid to digestion. Very soon after a meal is swallowed the wall of the healthy stomach begins to throw itself into waves of movement; at first these are very slight, but the more acid the contents of the stomach become the more vigorous are the movements. They consist of regular waves travelling down

Exercise at the School of Free Movement opened in the mountains near Arosa, on the Swiss-Italian border, where training is carried on in the open. Above. Visitors to a sun-bathing clinic near London exercising under the health-giving rays of the sun

EXERCISE : NATURE'S WAY OF KEEPING FIT



Exercise 1. This is known as the stationary run. The "running" should be on the toes, the knees raised to hip level, and the back kept flat. 2. With hands on hips, rise on toes, drop to a squatting position and rise on the toes again. 3. Lunge exercise, the movement being made first with right arm and leg, and then with the left. 4. Shadow boxing with vigorous imaginary blows is excellent for general development. 5. Two strong chairs make a good substitute for parallel bars. With the body weight resting on the arms, the legs are raised as nearly horizontal as possible. 6. From a prone position the rigid body is slowly raised and lowered in the position shown, the elbows being bent and straightened alternately

EXERCISES HELPFUL FOR MAINTAINING PHYSICAL FITNESS

the pyloric portion of the stomach to the valve which opens into the bowel. They go on steadily during the whole period of digestion, lasting on the average from three to five hours.

During this period, when a portion of the stomach contents is sufficiently acid and has been reduced to what is called chyme, small quantities of this semi-fluid material are expelled into the bowel at intervals of from two to five minutes. The advantage of this process is obvious, and exactly corresponds to the advantage of masticating one's food properly and not bolting it. As each little dose of chyme enters the bowel, it can be thoroughly mixed with the juices which it meets there, and which, as we shall see, are really more important than the gastric juice itself.

The most important part of intestinal digestion is not performed by the activity of the intestine or bowel itself, but by that of certain fluids which are poured into it from without; of these, one is the bile, which needs no further discussion beyond noting that it helps absorption of fats by forming soaps and further assists the action of the pancreatic ferments.

Of greater importance is the fluid which is formed by the pancreas, and which is poured into the bowel at the same point as that where the bile enters, that is, at a distance of about four inches beyond the point where the stomach opens into the bowel. This juice contains a number of very active ferments, and is conspicuously contrasted with the gastric juice in that it is markedly alkaline. The fluid is poured into the bowel by a remarkable mechanism which ensures its coming just exactly when it is wanted. The pancreatic juice is an extremely powerful digestive; it can completely digest a number of substances which are unaffected by saliva or gastric juice.

The pancreas is by far the most important organ of digestion. In the first place, its juice contains a ferment, trypsinogen, which, by means of another ferment secreted by the small intestine, and known as enterokinase, is converted into an active form as trypsin. The function of this ferment is to convert into peptone any protein that has escaped the action of the gastric juice, and to carry the digestion of peptone a stage farther. Proteins cannot be absorbed from the bowel except in the form of what are called amino-acids, and, to arrive at this last stage of protein digestion, the aid of still another ferment is called in, namely, erepsin, which, like enterokinase, is secreted by the lining of the small intestine.

The digestion of fat is also accomplished by the pancreatic juice; this is done by another ferment which has the power of splitting fats or oils into soap and glycerin which can be readily absorbed by the lining of the bowel. Thus, it is noticed that when the pancreas is diseased, or when, for any reason, its juice is prevented from entering the bowel, the greater part of the fat which is taken in the food leaves the bowel unchanged and unutilised.

But the power of the pancreatic juice is not yet exhausted; it contains a third ferment which exercises the same action as the ferment contained in the saliva, but in a far more marked degree. Hence the process which went on in the stomach for a short time under the action of the saliva is resumed, and much more vigorously, in the bowel. The result is that all the starch and starchy elements of the food are converted into a particular kind of sugar, the name of which, glucose, is quite familiar in commerce, and which has the form perfectly adapted for absorption into the blood.

In addition to the actions of the intestinal juice already mentioned, it should be added that certain digestive actions are carried out by the bacteria which normally inhabit the bowel.

Finally must be considered the absorption of the food thus digested. It has been seen that the stomach may practically be ignored as an organ of absorption; on the contrary, the lining of the bowel is perfectly adapted for this purpose. The large and highly developed cells which lie on the surface of this lining are really the active agents of absorption. From the bowel they take up water, the various desirable salts of the food, the sugar and the broken-up proteins, now in the form of amino-acids; and each of these passes into the tiny blood vessels which lie immediately underneath the cells.

The only other substance to account for is the fat or oil of the food. It has been shown that fat is split up by the pancreatic juice, and the substances into which it is split are taken up by the absorbing cells which have the power of putting them together again so that tiny drops of oil soon begin to appear in the cells. These do not pass into the blood vessels that lie just beneath them, but into what are called the lacteals.

This fluid is simply ordinary lymph with the addition of the oil globules that have been passed into it through the absorbing cells of the bowel, and is often known by the special name of chyle. The chyle passes upwards, the lacteals gradually uniting with one another and forming larger but fewer tubes, until at last it finds itself in a long, slender, single vessel called the thoracic duct, by means of which it is poured into one of the large veins at the root of the neck. Thus, at last, after all these wanderings, the fat which has been taken by the mouth enters the blood, which distributes it to every part of the body.

The large intestine absorbs water, so that the bowel contents become more and more solid. It would also appear that it can absorb the products of peptic digestion, if this is prolonged, and glucose, as in rectal feeding.

This completes the description of the essentials of digestion, but lately it has become common to apply a somewhat wider meaning to the word. This is done by drawing a distinction between primary digestion and secondary digestion. The long and complicated series of changes which have been described, resulting in the absorption of the nutritious elements of the food by the wall of the bowel, are all included under the term primary digestion.

The term secondary digestion may very properly be applied to the process by which the living cells of every tissue and organ of the body are able to take up the various substances they require from the blood, and utilise them for the purposes of their own life. Obviously it is correct to recognize this as the essential digestion. Hence all the processes of what is commonly called digestion should be regarded as mere preliminaries, necessitated by the vast complexity of the human organization, and essential digestion would consist in the process by which the tissues utilise and build up into themselves the food substances which the blood distributes to them.

DIGITALIS. The leaves of the purple foxglove, Digitalis purpurea, furnish one of the most valuable of all known drugs in its action on the heart. It is a very powerful drug and must never be used except under medical supervision.

Digitalis greatly increases the force of every beat of the heart, not only by slowing the pulse, but also by prolonging the period during which the heart muscle rests, that is to say, during the period between two beats. A further service done by this drug is that in lengthening the period of rest it lengthens the period during which the blood that nourishes the heart itself is able to flow through the two small arteries which pass into the substance of the heart muscle. At the time when the heart muscle is actually contracted the blood vessels in its substance are naturally squeezed ; hence it is only when the muscle relaxes its efforts for the rest of the body that it is able to receive its own nourishment. Probably the value of the drug is that it thus aids the nutrition of the heart.

Poisoning by Digitalis. Digitalis is one of the drugs which have a cumulative action, that is to say, after being taken regularly for some time there may be a sufficient amount of the drug in the system to give rise to symptoms of poisoning. It may be that the patient simply suffers from palpitation, but in severe cases his lips and finger-nails, or perhaps the face, become blue, and he is very breathless.

In these circumstances the patient should be made to lie down in bed, in the position which is easiest for him, and, while awaiting the doctor, hot coffee or spirits or sal volatile in water should be given. When a poisonous dose of digitalis has been taken, an emetic should be given, and thereafter draughts of tepid water in order to encourage vomiting. *See* Heart ; Poisoning.

DILL-WATER. This is a favourite and harmless drug for administration to children. Dill-water is very dilute, and a teaspoonful of it may be given to the smallest baby and freely repeated ; when given to a baby it should, of course, be warmed. Its value lies in the fact that it is able to relieve colicky pains.

It is very important to remember that dill-water is only a means of relieving symptoms ; it does nothing whatever to remove the cause of those symptoms, namely, improper diet. Certainly let the child have dill-water when colic keeps it awake at night, but begin to reform its diet in the morning. *See* Baby ; Colic.

DIPHTHERIA: ITS TREATMENT AND CARE

A Distressing and Dangerous Disease Explained

The following article tells how the symptoms of this illness may be recognized and what steps should be taken to treat it and prevent infection.
See Croup ; Disinfection ; Infectious Disease

Diphtheria is a very infectious disease which is caused by a particular microbe called the diphtheria or Klebs-Loeffler bacillus. The infection is usually direct from person to person, that is to say, from throat to throat, but it may be carried by milk, particles of dirt, slate-pencils, handkerchiefs, towels, etc. The disease is most common in youth, in cold climates, and in cold weather ; it definitely has what is called a seasonal incidence, causing most deaths in the last four months of the year. About two-thirds of all the cases of diphtheria occur under the age of ten years.

The introduction of the antitoxin treatment has completely revolutionised the whole aspect of the disease, and the mortality, which at one time depended on the age of the patient, nowadays depends far less upon age or any other condition whatever than upon the treatment, or want of treatment, by antitoxin and the date in the history of the case at which such treatment was begun.

The incubation period of the disease, that is to say, the time that elapses between infection and the appearance of the first symptoms, is short, being very rarely prolonged beyond four days ; it is generally understood to range from two to ten days. It is most important to remember that the symptoms of this disease show themselves very gradually and insidiously.

At the very beginning of the illness there is, unfortunately, nothing that is really characteristic. The child is obviously unwell, refuses food and is restless at night. The throat may be complained of, though this does not always happen ; but when it is examined it does not at first exhibit anything characteristic, even to the expert eye. Obviously this difficulty is still greater in the few cases of laryngeal or nasal diphtheria which have begun in those sites and have not spread from the throat.

When the false membrane, as it is called, appears in the throat, the diagnosis is usually made plain. The appearance of the false membrane varies. Sometimes it is thin and of a bluish-grey colour, when it will be found that only the diphtheria bacillus is present. But in other cases it is thick and leathery and of a yellowish-white colour, showing that there is a mixed infection, the diphtheria bacillus being accompanied by several other microbes. In a pure case there is very little swelling, redness or pain, so that, as stated above, the child may never mention the throat when complaining of feeling unwell.

The little glands in the neck are usually enlarged, the pulse is at first rapid but may become slow and irregular, and as a rule the patient is prostrated. The temperature is rarely high, and after the first two or three days it is apt to fall below the normal; this fact and the prostration and the state of the pulse all indicate that the danger to be feared in diphtheria is poisoning of the nervous system and of the heart. It is from failure of the heart that death is apt to occur, and this may be in the third or often in the fourth week of the illness.

Convalescence is very prolonged, and exceedingly apt to be interfered with by complications. The patient must be regarded as in danger of cardiac failure for no less than four weeks after the beginning of his symptoms. Thus in many fever hospitals it is the rule that diphtheria patients are to be kept in bed for at least three weeks and are not even to be allowed to sit up in bed in order to be examined.

The complications of this disease now comparatively rarely witnessed consist of trouble with the ears, the spread of inflammation to the lungs, interference with the action of the kidneys, and, most especially, diphtheritic paralysis, due to the action upon the nerves of the poison produced by the bacilli. This is most commonly witnessed in the soft palate, the paralysis of which causes difficulty of speaking and swallowing. The muscles in the eye which adjust the lens for reading and other near work may be paralysed, and it has happened not infrequently that the loss of power to see print distinctly has provided the first hint that the person had been suffering from diphtheria.

This disease must always be regarded as extremely grave, the most urgent and immediate treatment being demanded. What appears to be the mildest case may die of heart failure or of suffocation due to the spread of the false membrane.

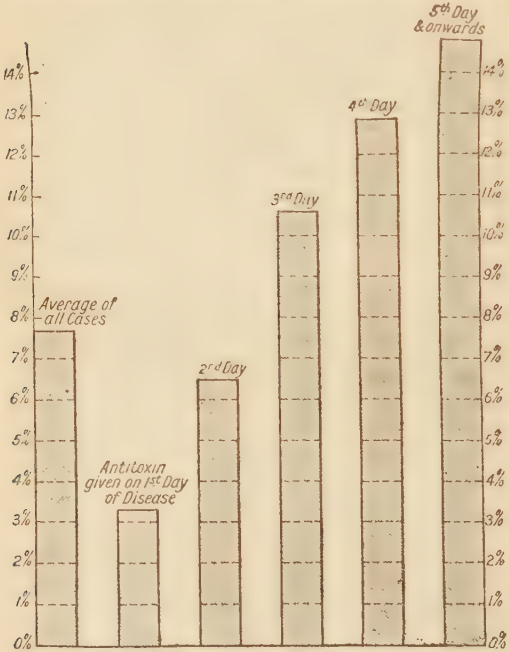
The treatment of diphtheria is one of the greatest triumphs of modern medicine. It consists of the injection under the skin of a substance called the diphtheria antitoxin or the antidiphtheritic serum. This is obtained by injecting the poisons produced by the bacilli, when they are grown in the laboratory, into the blood of horses kept for the purpose; in the blood of these animals there appears, after a time, the antitoxic substance.

The results of this treatment are extremely striking. The membrane ceases to spread or to reappear if removed; that which is present soon vanishes; the foul discharge from the nose disappears, and with it the difficulty in breathing and swallowing; the inflammation in the neck subsides; temperature and pulse rate approach normal; and complications are practically unknown.

If antitoxin be given on the first day, the disease is almost always cut short. The prospects become rapidly worse, however, the longer serum treatment is delayed.

In addition to this essential treatment, it must be remembered that the patient's heart is in danger. Therefore he must be permitted to make no exertion whatever, and must be protected from any kind of shock. In many cases the patient cannot be allowed to sit up, and a bed-pan must be used. He must be liberally fed, milk and strong broths being given in small quantities frequently, or other food if the digestive powers appear to warrant it.

Various antiseptics and soothing applications may be used for the throat, but they are really of secondary importance unless the throat is very foul. In making applications to the throat the nurse should protect her eyes with goggles, and if anything is spluttered on to her face it should be wiped off with a piece of cotton wool dipped in an antiseptic.



DIPHTHERIA. Chart showing how an increased death rate follows delay in administering antitoxin

Cases are still occasionally seen which may present the grave complication which used to be so familiar, the child being threatened with death by suffocation. The antitoxin must, of course, be immediately employed; but if the child threatens to die on the spot more must be done, and the choice lies between two operations. The first, known as intubation, consists in inserting a rigid tube within the child's larynx so that, no matter how much the membrane grows, there is still a passage left for the air. The other operation is what is known as tracheotomy.

Finally, it is to be remembered that the disease is extremely infectious. Whenever, therefore, there is the least suspicion that anyone is suffering from diphtheria, he should be at once isolated. No one should be allowed to enter the sick-room except the persons in attendance. Discharges from the nose or mouth should be wiped off with cotton wool or with rags, and these should be burnt immediately. Clothing and bed linen should be put to soak in a disinfectant before being taken from the sick-room.

By a method known as the Schick test, which is carried out by inoculations on the skin, it can be determined whether anyone is particularly prone to contract diphtheria, and protective inoculations of what is known as a toxoid-antitoxin mixture can be made. This is a great gain in dealing with outbreaks of diphtheria in schools, institutions and elsewhere.

A very important agent in spreading the disease is a person known as a carrier. The germs of diphtheria occur frequently in the throats of people who are not suffering from the disease, and sometimes the germs are active and capable of communicating the disease to susceptible people. In all outbreaks it is of supreme importance, therefore, to discover such carriers, and to disinfect their throats.

A person who has been suffering from diphtheria is a danger to others for at least three weeks from the disappearance of the membrane, and until two swab tests have proved negative. Anyone who has been in contact with a person suffering from diphtheria must be kept in quarantine till, by sufficient swab tests the throat has been shown to be free from the germs.

DIPSOMANIA. By this term is understood an uncontrollable craving for alcohol which descends on its victim at intervals sometimes of weeks, but in other cases after longer periods. The craving is constitutional, a legacy from ancestors. During the intervals the individual is not addicted to alcohol.

There are certain indications which may give warning of the approach of an attack. The behaviour may be different, there may be marked restlessness and the appetite may fail. If an outburst cannot be averted, the individual begins to drink and goes on till he is pulled up, perhaps by developing a disgust for liquor, by severe vomiting and retching, or by an attack of delirium tremens.

The use of apomorphine, by inducing sickness and vomiting, may ward off or cut short an attack. Sometimes drugs are successful in taking the place of alcohol and in relieving the craving, and the following combination is well worth trying :

Tincture of capsicum	1½ drachms
Liquid extract of red cinchona	2 drachms
Syrup of ginger	4 drachms
Chloroform water	to make 6 ounces

A tablespoonful of this to be taken in a wineglass of water whenever it may be necessary.

In some cases hypnotism appears to have been effectual in abating the craving. *See* Alcoholism ; Delirium Tremens.

DISINFECTANT. Any agent which kills the germs responsible for causing infectious diseases may be classed as a disinfectant. Heat of sufficient intensity is a thorough disinfectant and can be readily utilised. Thus, combustible articles from infected surroundings, and of no particular value, should be promptly burnt. For some articles of value, dry heat in the form of hot air is effective, and it is utilised for disinfecting books, etc. This must be done, however, in an apparatus under expert supervision. Articles which can be kept boiling for half an hour or longer are efficiently disinfected. The best way to disinfect bedding, clothing, and other fabrics is by exposing them to steam at a high pressure in a special disinfector, the method adopted for such things by the sanitary authorities.

There are many reliable chemical disinfectants, including corrosive sublimate (perchloride of mercury) biniodide of mercury, carbolic acid, lysol, and other substances derived from coal tar, bleaching powder, formaldehyde, the vapour of burning sulphur, permanganate of potash, iodine, hydrogen peroxide, and numerous other substances.

It must always be borne in mind that the substances above mentioned only disinfect when they are used in sufficient strength and for a sufficient time. Weak solutions of permanganate of potash, for example, cannot be depended on to disinfect thoroughly though they will remove disagreeable odours.

Substances which either remove or cover bad odours are classed as deodorants. The smoke of tobacco or of brown paper and eau-de-Cologne are used for this purpose, but they do nothing to interfere with the danger lurking in the substance which causes the smell. Permanganate of potash and chloride of lime deodorise and in strong solutions also disinfect.

Scrubbing woodwork, etc., with soap has some value in disinfection, and so has exposure to sunlight and fresh air, especially after articles have been properly washed; but the exposure to sunlight should extend over several days. *See* Antiseptic; Cresol; Eusol; Formalin; Hydrogen Peroxide; Infectious Disease; Lysol; Sulphur.

DISINFECTION. The problem of the disinfection of a room which has been occupied by a patient suffering from an infectious disease is much simplified if the room has been previously prepared for the reception of such a patient. The carpet will have been take up and replaced by one or two light rugs, heavy hangings will have been replaced by light, washable curtains, unnecessary furniture will have been taken from the room and stuffed chairs and couches replaced by plain washable furniture. Books, pictures and things of the kind will also have gone. The only books allowed in the sick-room should be such as can afterwards be burnt.

Where, however, a patient has sickened with an infectious disorder in a room containing articles of the kind mentioned, nothing should be taken from the room without first consulting the doctor or the sanitary inspector. In most instances the disinfection of rooms, bedding and clothing is undertaken by the sanitary authority, with a minimum of trouble to the householder. It may happen, however, that the latter has to carry out disinfection himself.

In most cases of infectious disease, paper handkerchiefs should be used for nasal discharges and sputum, and should be burnt immediately. When the discharges of the bladder and bowels may be infectious they should be received into a vessel containing some disinfectant. For this and other purposes a useful disinfectant consists of a solution of lysol in the strength of a teaspoonful to the pint. When a motion has been passed, more of the antiseptic solution will be poured over it and the motion will be thoroughly broken up with a piece of stick and mixed with the solution. The motion should then be allowed to stand for two hours before being put down the privy stool or buried.

The patient's discarded clothing, bedclothes, etc., should be put in the antiseptic solution and left to soak in it for twenty-four hours before being taken out to wash. The washing should be thorough, and blankets and other heavy fabrics should be put out to the fresh air for three or four consecutive days. If they can have the benefit of sunshine so much the better.

After handling the patient, and always before taking food, the nurse should immerse her hands in the antiseptic solution for a minute or two. If the sanitary arrangements of the house include sinks and a water closet, strong solutions of soda in boiling water should be put down the pipes at frequent intervals. A pint of the antiseptic solution should then be allowed to remain in the stool or pipes for half an hour, that is to say, the plug will not be pulled nor water run through the sinks during that time. Bad smells may be removed by pouring a solution of permanganate of potash, chloride of lime or formalin down the pipes.

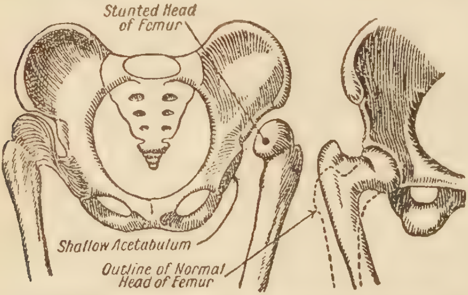
With regard to the disinfection of the air in the room, the only thing that matters, and it matters a great deal, is to have free ventilation. Saucers of solution of permanganate of potash, carbolic acid or anything else, placed about the room are perfectly useless.

When the time comes to disinfect the sick-room, the best agent for the ordinary person is probably sulphur. It must be remembered, however, that sulphur vapour is not active except in the presence of moisture. It is necessary, therefore, to moisten thoroughly the walls of the room. Metallic articles should be washed with the disinfectant solution and taken from the room. Cupboards should be opened and drawers pulled out. A deal table should be stood in the centre of the floor, and on this a large basin or a shallow bath containing a little water. The chimney is stopped by newspapers and the seams of the window-sashes by gummed paper. Water is freely sprinkled over the floor and the table.

Roll sulphur may be used, 4 lb. for each 1,000 cubic feet of space, or sulphur candles may be obtained of an appropriate strength. The sulphur is placed in a small basin or plate which is put on the water in the large basin, and if roll sulphur is being used it should be moistened with methylated spirit. The sulphur is now lit and the seams in the door are closed with gum paper. After twenty-four hours the room may be opened, and when it becomes possible the windows are thrown widely open and the chimney cleared ; for a day or two doors and windows should be left open so that there will be a through draught. The paper should be stripped from the walls and burned, the ceiling limewashed and the floor and other woodwork thoroughly scrubbed with soap and warm water. *See* Infectious Disease ; Ventilation.

DISLOCATION. A dislocation is an injury to a joint in which the bones that form the joint are displaced from their normal relationship (Plate 22). For this to happen, the strong, fibrous textures called ligaments, that enclose the joint and keep the bones in their places, must be torn. The position of the tear, and the principal direction in which the bones depart from their proper position, will depend upon the direction of the force that has caused the injury.

Occasionally dislocations occur from causes less obvious. For instance, there may be a progressive disease of a joint, especially tuberculosis, which gradually destroys the ligaments or wears away the bones, and thus gives rise to a dislocation. And in other cases, such as in the very common condition known as congenital dislocation of the hip joint, the bones that enter into the joint have never properly developed, and thus, when strain is put upon it, dislocation ensues.



DISLOCATION. Examples of congenital dislocation of the hip. That on the right is termed coxa vara

Dislocations are usually divided by surgeons into three kinds : simple, compound and complicated. In the first there is nothing but the dislocation ; in the second the skin is broken and there is a track leading from the exterior down to the dislocated joint ; in the third the dislocation is complicated by fracture of one or more of the bones that enter into the joint.

The violence that causes the ordinary kind of dislocation may be external violence, as in the case of a fall, or a blow upon the back of a stooping person, such as often causes dislocation of the hip joint ; or it may be due to too violent muscular action, as in the case of an extreme yawn, which occasionally causes a dislocation of the lower jaw (Plate 22). Dislocation is commonest in middle life ; in the young and in the elderly the bones, rather than the joints, give way.

The symptoms of dislocation are what might be expected ; the movements of the joint are restricted, and there may be kinds of movement which are not possible in a normal joint. In some cases the dislocation causes lengthening, in others shortening, of the limb. In addition, there are numbness and pain due to unusual pressure upon the nerves, and the limb usually swells, since the veins that bring the blood back from it are commonly pressed upon.

Every kind of dislocation needs expert surgical treatment. The injury that has been done to the joint may be much increased by the efforts of incompetent people to reduce the deformity. First-aid treatment consists in resting the part, for example, putting the upper limb in a sling, and applying cold cloths to relieve pain. Shock is treated by keeping the patient warm. *See* Ankle ; Joint ; Knee, etc.

DISSEMINATED SCLEROSIS. Disseminated, multiple or insular sclerosis is a chronic disease of the brain and spinal cord. By sclerosis is meant the replacement of nervous tissue by fibrous or scar tissue, entailing the destruction of nerve cells and the interruption of nerve fibres. The scar tissue occurs in plaques of varying size disseminated through the brain and cord. They begin as areas of inflammation, and, although there is a strong suspicion that this inflammation is wrought by microbes, it cannot yet be proved.

The disease affects young people chiefly, and the first symptoms noticed may be stiffness and weakness in the legs. A notable symptom is what is called " intention " tremor. This means that when the patient puts his mind to do something, for instance, lift a glass of water to the mouth, the hand and arm shake, perhaps so violently as to spill the water. Another notable symptom is a peculiar oscillation of the eyeballs known as nystagmus ; the vision may also become affected. Mental symptoms, such as weakness of memory and emotional excitability, may also appear. A noticeable feature of disseminated sclerosis is that improvement may set in and last for a long time, so that false hopes of cure may be aroused.

Treatment is not very satisfactory, though some benefit seems to accrue from large doses of arsenic. The patient should be kept warm, and should avoid either mental or bodily strain. In the later stages of the disease, when the patient is bedridden, care must be taken to prevent bed sores (q.v.). *See* Nervous System.

DIURETIC. A diuretic is a drug, or indeed any measure, which aids the flow of the secretion of the kidneys. By far the best of all diuretics, as well as the safest and the most widely useful, is water. There are a number of people who do not drink sufficient water and whose urine is therefore apt to be too concentrated ; but there are a number of cases in which the object of stimulating the kidneys is to aid in the removal of excess of water present in the body. In such cases, of course, other diuretics than water must be used. Amongst them are digitalis, alcohol and coffee. The other great group of diuretics are simply salines, or mineral salts, such as the acetate and citrate of potassium, the citrate of sodium and many more.

It is a general rule in the case of salts that if they are given in small doses they pass into the blood and stimulate the kidneys, and therefore are diuretics ; whereas if they are given in much larger doses they do not pass into the blood at all, but stimulate the bowel by their contact with it and so act as purgatives.

The spirit of nitrous ether, dose 15 to 60 minims, and the solution of ammonium acetate, otherwise Mindererus solution, 2 to 6 drachms, are useful diuretics, and are much given in fever cases. Another simple diuretic in such cases is Imperial drink, that is, home-made lemonade containing a teaspoonful of cream of tartar to the pint. This may be taken freely. Other diuretic remedies are squill, calomel, broom, turpentine, copaiba, etc. *See* Kidney ; Urine.

DIZZINESS. When a person is dizzy he may feel himself whirling round or up and down ; on the other hand, he may appear himself to be steady while the objects around him are whirling. If the dizziness is severe he may fall to the ground, and he may become sick and vomit.

A slight more or less constant giddiness is common in neurasthenia, in chronic gastritis, in that loss of elasticity of the arteries in elderly people which is known as arterio-sclerosis, and in those who use tea, coffee, alcohol or tobacco immoderately. It is found also in those whose vision is defective, more particularly when there is a tendency to squint ; in such cases the provision of properly fitting glasses may completely remove the giddiness.

People who have thickened arteries very often feel giddy when they look upwards and in assuming the erect position quickly, for example, in getting out of bed. A sudden severe attack of dizziness may be one of the symptoms of acute indigestion, when it is likely to be associated with headache, blurring of vision, sickness and vomiting. Here the giddiness as well as the other symptoms may be greatly relieved by free vomiting.

Another cause of sudden dizziness is epilepsy, when the symptoms may occur either as part of the aura which precedes a fit, or as an attack of petit mal, the form of epilepsy in which the patient is not convulsed and the loss of consciousness is only momentary.

Dizziness may be connected with the ears ; a plug of impacted wax, for instance, or even syringing may bring on giddiness and sickness. Disorders of the inner ear or labyrinth may bring on what are called Ménière's symptoms. There the giddiness is sudden and severe; the patient may fall and may lose consciousness for a moment. There are noises in the head, hissing, blowing or banging, and more or less deafness.

Disease of the brain, and of the cerebellum in particular, is another of the many causes of giddiness.

Treatment of dizziness obviously depends upon the cause in each case. *See* Ear; Epilepsy; Equilibrium; Indigestion; Neurasthenia.

DOMESTIC MEASURES. It has been customary to use spoons and other domestic utensils as measures for drugs when they are being given to a patient, the capacity of those commonly used being as follows:

One teaspoonful	1 drachm
One dessertspoonful	2 drachms
One tablespoonful	½ ounce
One wineglassful	2 ounces
One teacupful	5 ounces
One breakfastcupful	10 ounces
One tumblerful	10 ounces

It should be borne in mind, however, that the capacity of such things varies considerably, so that when accuracy is necessary a properly graduated glass must be used to measure out a dose. *See* Apothecaries' Weights and Measures; Dose; Drug; Medicines; Prescription.

DOSE. The whole subject of dosage is both difficult and important, not only because drugs differ in their action according to the dose in which they are given, but because there are so many individual variations in different people. Other things being equal, the action of any drug must depend on the proportion between the amount of it that is given and the total mass of the body in which it acts. Thus the really scientific method of giving drugs would be to calculate the dose in proportion to the patient's weight.

Another most important point in dosage is that the age of the patient has an important influence, quite apart from the weight. In the case of some drugs, such as arsenic, it is often possible and desirable to give larger doses to a child of twelve than many adults can tolerate. On the other hand, it would not do at all to calculate the dose of opium to be given to a baby merely by estimating its weight, for babies are very susceptible to this drug, and indeed it is only in the very rarest cases that any dose of opium should be given to a baby under one year old.

A rough rule for determining the dose suitable for a child is to give a fraction of the adult dose calculated by taking the child's age as the numerator and the age plus 12 as the denominator. Thus, the fraction of an adult dose of, say, 20 minims for a child of 8 would be $\frac{8}{8+12}$ or $\frac{2}{5}$ of 20, that is, 8 minims.

The doses of drugs in the British Pharmacopoeia are stated as being from so much to so much, for example, 5 to 15 minims, a dose between these limits being supposed to represent what should be efficient in most cases and what is safe. In the case of powerful drugs, mercury, for example, it is usually advisable to begin with the minimum dose or even less, for some people have an idiosyncrasy for certain drugs, and alarming or unpleasant symptoms may follow quite small doses. When a single dose is to be given, it is often larger than what is expedient for repeated doses. *See* Apothecaries' Weights and Measures; Drug; Medicines; Prescription.

DOUCHE. This is the name given to treatment of any part of the body by means of a stream of water. It is a very valuable measure, and its value is simply the same as that of the application of water to the skin. It washes and cleans the part to which it is applied. The most frequently used form of douche is that employed by women.

Two precautions should be taken regarding the water that is used. As the risk from microbes is greater in the case of water that is used for washing the interior of the body than when it is applied to the very resistant skin, all water used for douching purposes should be first boiled; secondly, it must be raised, or rather allowed to cool after boiling, to the temperature of the blood, that is to say, about 100° F. The application of a cold douche to any part of the interior of the body is injurious.

For a vaginal douche one may use an apparatus consisting of a container from which a rubber tube about six feet long is led, having at its other end a tube for introduction into the vagina. Such an apparatus must be kept scrupulously clean. The force with which the lotion used for the douche flows through the tube will vary, of course, with the height at which the container is placed. If this is only raised two or three feet the flow will be gentle, though generally sufficient for the purpose.

The lotion used will depend upon the condition for which douching is required. A good antiseptic lotion consists of a tablespoonful of lysol in five pints of water. A deep pink solution of permanganate of potash is also useful, and will help to remove any disagreeable odour. To get rid of discharge the addition of a tablespoonful of common salt or of bicarbonate of soda to a quart of water will generally suffice. Astringents, such as zinc sulphate, alum, etc., may be ordered by a doctor. *See* Baths; Ear; Enema; Nose; Rectal Douche; Vagina.

DOVER'S POWDER. The compound ipecacuanha powder, the essential ingredient of which is opium, is popularly known as Dover's powder, and it contains one grain of opium in ten grains. This is a considerable proportion, and the powder should not be used except on a doctor's prescription. At the beginning of a severe cold the drug is very valuable, as also at the very beginning of bronchitis.

DRESSING. In surgery the materials used for the protection of parts, or to favour healing, are described as dressings. In some instances protection may be needed against cold or rubbing or other kinds of mechanical injury; more often it is against infection by the microbes which cause inflammation and suppuration. Instances of protective dressings are covering a burn with a waxy film like that of ambrine, or an abrasion with new skin or with collodion. Fabrics used for this purpose must either be sterilised by heat or be charged with chemical antiseptics.

In other instances a stimulating effect is wanted, when an ulcer may be dressed with, say, red lotion; or a soothing effect is needed, so it is dressed with lead lotion, zinc ointment or something similar.

When a wound or ulcer is discharging it is all-important that the dressing should be able to absorb the discharge. When possible, a dry dressing is used for a wound because the heat and moisture of a wet dressing may favour the growth of germs; but when a wound or ulcer is inflamed or covered with crusts a wet dressing is better suited for cleansing the parts, and the fabric used is lightly wrung out of an antiseptic lotion and generally also covered with gutta-percha tissue or oiled silk, so that it acts as a fomentation.

The first dressing applied is either lint or gauze. Plain white or surgeon's lint and plain gauze may be sterilised by heat, and packages containing these sterilised dressings can be bought; for emergencies unsterilised gauze and lint are more commonly used, and before applying are firmly wrung out of carbolic, lysol or another antiseptic lotion. Boric or pink lint is ordinary lint which has been soaked in a saturated solution of boracic acid and allowed to dry. It may be put on dry or may be wrung out of boiled water.

Lint, it will be observed, has a smooth and a hairy side; the former should be applied to a sore or wound because the hairy surface is very apt to adhere.

There are several kinds of antiseptic gauze: cyanide gauze (mauve), iodoform gauze (yellow), and sal-alembroth gauze (blue). The two former are those most frequently used, iodoform gauze being particularly useful for tubercular conditions. Before application, either gauze is very often firmly wrung out of carbolic lotion (1 in 40).

Over the lint or gauze, or oiled silk or gutta-percha tissue, if these are covering gauze or lint, cotton wool is spread in considerable thickness. This must be of the absorbent variety, and often takes the form of gamgee tissue, that is, a layer of cotton wool with a layer of gauze on either side of it. Cotton wool charged with some antiseptic, and also sterilised by heat, can be obtained. Last of all a bandage is applied (Plate 2).

Dressings which have been sterilised by heat cease to be aseptic when they are opened out and handled in circumstances which permit of microbic contamination. This happens, for instance, if the hands of the person dealing with them are not covered with sterilised rubber gloves or otherwise sterilised, or if the dressings are laid down on a bed-cover or anything else which has not been sterilised. For dressings done at home it is safer, therefore, to use those charged with some antiseptic. Even these are not safe unless they are kept clean, and it is recommended that in storing them at home the dressings should be kept in clean paper packages which are put into a tin box with a tight cover. *See* Ambrine; Antiseptic; Collodion; Cotton Wool; Fomentation; Gamgee Tissue; Iodoform; Jaconet; Sterilisation; Wound.

DROPSY. An accumulation of watery fluid in the tissues and serous cavities of the body is described as dropsy or oedema. This fluid is always present in tissues, filling up the interstices between the component cells, and is derived from the blood. In dropsy it is greatly increased; the tissues are, as it were, water-logged and they become swollen.

When it affects the skin the existence of dropsy is shown by what is called pitting; when the skin is pressed firmly with the finger a depression is left which takes some time to fill up again. Dropsical fluid in a serous cavity may accompany dropsy of the skin or occur independently; when it occurs in the peritoneal cavity, that is, the space between the abdominal viscera and the abdominal wall, the condition is usually referred to as ascites.

Dropsy may occur from many and various causes; it is not a disease in itself, but merely a symptom. A common cause is obstruction of the veins, and the dropsy is then due to back-pressure. A tight garter, for example, may cause dropsy in the limb below it; or varicose veins may result from blocking of a vein by a clot, or thrombus, or from the pressure of a tumour. In cirrhosis of the liver the flow of blood in the portal vein is obstructed by scar tissue pressing on the veins within the liver and ascites is likely to result. When the heart is weak and the circulation feeble, dropsy may appear in the legs after the patient has been walking about, or in advanced cases there may be dropsy all over the body, including the serous cavities.

Poverty of the blood, as in anaemia, may also cause dropsy. It is a common symptom of beri-beri, a disease caused by vitamin starvation. Oedema about the face and neck may occur from shellfish poisoning. The most common cause of general dropsy is acute nephritis or Bright's disease, and here the earliest site is usually about the eyes.

The treatment of dropsy depends on the cause. Unless it is due to such an obvious thing as a tight garter, a doctor should be consulted without delay. *See* Ascites; Bright's Disease.

DROWNING. A person taken from water in an unconscious condition may be suffering from syncope, or more or less complete arrest of the heart's action, induced by impact with the water, fright or fatigue, or from asphyxia, due to the filling of the air passages with water. The first thing to do is to open the mouth and clear the throat of any gravel, sand or weeds which may have been sucked in by convulsive attempts at breathing. The patient should then be turned on his face and artificial respiration (q.v.) commenced without delay. The compression of the chest which forms part of this procedure will force water from the lungs and air passages. Artificial respiration should be continued until a doctor arrives, or for an hour at least.

Meanwhile, dry blankets and clothing, hot-water bottles, stimulants and a stretcher may be procured, and, if it can be done without interfering with the movements of the operator, wet clothing may be taken from the lower limbs and dry put on. When the patient starts natural breathing, but not before, brisk efforts should be made to improve the circulation by putting protected hot-water bottles between the legs and chafing the limbs, the patient being covered with blankets or dry clothing. When he can swallow, he may be given a little diluted spirits or sal volatile, or tea or coffee.

In handling the patient it should be borne in mind that he may have broken a bone by striking against something in falling into the water or by his struggles. The patient should not be allowed to walk home but should be carried, preferably on a stretcher of some kind. He should be kept lying down, and, in the course of his removal and for an hour or two after he has been put to bed, a close watch must be kept on him, lest breathing should again stop ; if it does, artificial respiration should be resumed at once. *See* Artificial Respiration ; Asphyxia.

DRUG. Substances, other than foods, which are used in medicine to modify the activities of the body are described as drugs. Some are vegetable products ; some, minerals ; some are of animal origin and the others are synthetic, that is, built up in the laboratory.

The medicinal virtues of a plant usually reside particularly, or even exclusively, in one of its parts : the leaf, the root, the wood, a gummy or resinous exudation, or some other part. Such are supplied to the pharmacist in a crude state, and, by a variety of processes he makes from them powders, infusions, essential oils, tinctures, pills, ointments and other preparations.

In such preparations many of the constituents of the crude drug may be included ; but one or more of these is the actual agent in producing the effects of the drug on the body, and so is described as the active principle. Samples of crude drugs are found to contain very varying amounts of active principle. The treatment of disease by drugs can only be safe and efficient, however, if equal doses of the same preparation of a drug always contain the same amount of active principle, and in compilations like the British Pharmacopoeia the amount which must be present in each preparation mentioned is laid down.

Crude mineral drugs usually require to be purified as, in natural deposits, they may be associated with other chemicals ; from the purified drug salts and other preparations are then made. Animal products which have long been used in medicine include Spanish fly, spermaceti, lard, pepsin and pancreatic extract. More recently the extracts of the thyroid and pituitary glands, of the supra-renal bodies and of the islets of Langerhans in the pancreas, or insulin, have come into use.

Synthetic drugs are very numerous, and new ones are constantly making their appearance. Many, including antifebrin and similar drugs, are coal-tar derivatives.

Besides classifying drugs according to their source, they may be classified according to their main action on the body, as antacids, depressants, stimulants, tonics and so on. Some, such as iron, lime, sodium or iodine, which are normal constituents of the body, may be administered when it is thought that there is a deficiency in the body, and then would act rather as foods than as drugs. Other drugs, such as alcohol, of which a certain amount may be burnt up in the body and furnish heat and energy, act as foods in so far as that happens.

Most drugs are given either to increase or depress the functions of one or more of the organs or tissues of the body, according as it is imagined that this is sluggish or over-active in the circumstances of the case. Other drugs, such as mercury, quinine and organic compounds of arsenic, are given to kill parasites within or on the body. *See* B.P.; Dose; Inunction; Ionisation; Liniment; Lotion; Lozenge; Medicines; Prescription; Serum-therapy; Suppository; Tincture; Vaccine.

DRUG HABITS. Many useful drugs are saddled with the heavy disadvantage that they tend to create a craving in any person who employs them habitually, perhaps even for a short time. This craving may become nearly irresistible, so that addicts reach a point when they will readily lie or even steal in order to obtain a supply of the drug.

Drugs of this sort produce a temporary sense of well-being through their action on the nervous system, but this is followed by reaction in the form of depression or discomfort, to relieve which further dosing is resorted to and a vicious chain is forged. Sooner or later ill effects become apparent; digestion and sleep are impaired, there is nervous irritability, sanity may be lost and the patient may die from poisoning or take his or her own life.

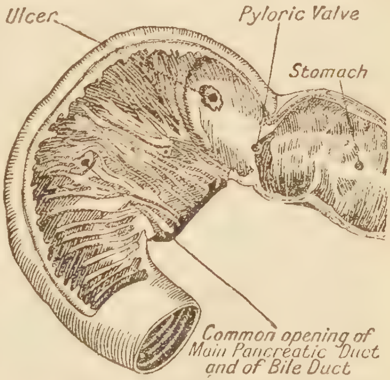
A drug habit is very difficult to eradicate, and the only really hopeful way of dealing with the problem is to prevent the habit being formed. Legislature has helped in this direction by enacting strict regulations for the supply to the public of opium, its derivatives, cocaine and preparations containing more than a certain small percentage of any of these. Except in so far as those drugs are used by qualified dentists and veterinary surgeons, they can only be supplied on a medical prescription.

When a drug habit has been formed the only satisfactory method of treatment is to get the patient into an institution where it will be impossible to obtain the drug. Tonic medicinal treatment may form part of the cure, to relieve depression following the discontinuance of the drug, but moral treatment is what is really valuable, in the form of helpful advice and encouragement.

All this applies to alcohol equally with other drugs. Little or nothing can be expected from nostrums exploited as "drink-cures"; some of these aim at their effect by inducing nausea, others by suggestion, but all are broken reeds if a drink habit has really been established.

It is sometimes forgotten that tobacco, tea and coffee or similar beverages are also drugs. While it is true that their use in moderation is not only harmless to the great majority of people, but probably actually beneficial, it is no less true that over-indulgence in any one of them may have a very injurious effect on health. *See* Alcohol; Cocaine; Opium; Poison.

DUODENUM. So called because its length was estimated at twelve finger-breadths, the duodenum, which is the first part of the small intestine, is actually about eleven inches long in the average adult. At its commencement it is continuous with the pyloric end of the stomach, and, at its termination, with the jejunum or next part of the small gut. It is disposed somewhat in the shape of a horseshoe, the ends of the limbs being about two inches apart. In the hollow lies the head of the pancreas. The duodenum comes into contact also with the lower surface of the liver, the gall bladder and the right kidney.



DUODENUM. A duodenal ulcer is apt to form near the pyloric valve, where the acidity is greatest

The cavity of the duodenum is separated from that of the stomach by the pyloric valve, and about three or four inches below the valve there is a little projection, a papilla, on the lining membrane of the gut which marks the common entrance of the bile and pancreatic ducts. While digestion is going on in the stomach the pyloric valve opens periodically, and some of the acid contents of the stomach, the chyme, is discharged into the duodenum and by its contact with the lining of the latter stimulates closure of the valve. It mixes with the alkaline pancreatic juice and bile, however, and the acidity is neutralised; when this happens the valve again opens and lets in more chyme.

It is noteworthy that a duodenal ulcer almost always forms above the point of entry of the alkaline juices, and, therefore, where the lining is exposed to the action of the acid chyme. It is thought, however, that an important factor in causing such ulcers is sepsis, either swallowed from an infected mouth, nose or throat, or coming from a diseased appendix or gall bladder.

A duodenal ulcer is more common in males. It usually causes pain, the common site of which is to the right of the middle line in the upper half of the abdomen. It comes on generally from two to three hours after a meal, and its appearance often coincides with the patient becoming hungry for his next meal; this is called hunger pain, and may occur in the early hours of the morning. The pain is relieved by taking some food or by a large dose of bicarbonate of soda. More or less bleeding takes place from the ulcer; if very slight it can only be detected in the stools by careful examination by special methods; if in large quantity it may cause black motions, or melaena, or even appear as red blood. Sometimes blood is vomited.

If there are definite signs of a duodenal ulcer, medical treatment, such as rest, diet and alkaline drugs, may be tried, but the desirability of early operative treatment is founded on the risk of serious haemorrhage or a perforation, and on the likelihood of an ulcer which has healed under medical treatment breaking down again. There is little or no risk of cancer. *See* Digestion; Gastric Ulcer; Indigestion; Intestine; Stomach.

DUPUYTREN'S CONTRACTION. In middle-aged people, especially men, the ring finger, perhaps also the little finger and less frequently the middle and index fingers, may be bent into the palm at the knuckle joint. This deformity is known as Dupuytren's contraction. The condition is due to thickening and shortening of the palmar fascia, which sends down processes to be inserted into the fingers. Heredity seems to play a part in causation. The treatment is to remove the fascia. *See* Finger.

DUST DISEASE. The excessive inhalation of dust, which is incidental to many occupations, is liable to set up morbid changes in the lungs, known as pneumokoniosis, or dust disease. The dust particles are deposited in the lungs and cause irritation and inflammation, followed by fibrosis, or scar formation, which is Nature's method of sequestering the irritating substance. The scar tissue takes the place of spongy lung, however, and to the extent to which this happens there is subtraction from the functional activity of the organ.

There are catarrhal processes in the air cells and in the bronchial tubes, the symptoms of the disorder when established being those of chronic bronchitis. Many sufferers contract tuberculosis of the lungs, though the liability to this is very much greater when the dust includes particles of silica, as in that inhaled by stonemasons, potters, printers, those employed in quartz mines and others. Disease caused by mineral dust containing silica is called silicosis, by iron dust siderosis, and by coal dust anthracosis. The inhalation of coal dust does not predispose to tuberculosis of the lungs.

In occupations in which workers are exposed to the risk of dust disease, an effort to remove the risk should be made by good ventilation, by the use of exhaust fans, by moistening the substance creating the dust, by spraying the air and by the use of respirators.

When the signs of bronchial irritation first appear it may be possible by treatment and by a change of occupation to arrest the disease, but when the morbid process has become established, beyond relieving the cough and improving the general health by cod-liver oil and other tonics, little can be done. *See* Bronchitis ; Consumption.

DYSENTERY. An infectious disease, characterized by inflammation and ulceration of the bowel, dysentery is mainly a disease of warm climates, though sporadic cases occur elsewhere and occasionally even epidemics in institutions such as asylums. Mostly the disease is caused by a bacillus, Shiga's or Flexner's, or by a minute animal parasite, or protozoon, the entamoeba histolytica ; in the latter event the disease is also known as amoebic or tropical dysentery. Occasionally the disease is caused by another protozoon, balantidium coli, or by parasitic intestinal worms, and dysenteric symptoms may occur in malaria.

Infection occurs through food or beverages which have been contaminated by infected faeces. It may be by drainage into shallow wells or streams from which the water supply is drawn, by flies, or by persons who carry the infection being allowed to handle food. Uncooked fruits or vegetables which have been washed with polluted water may introduce the infection.

The disease commonly begins like a sharp attack of diarrhoea, but the calls to empty the bowel become very frequent, and the patient may be allowed very little rest. The first evacuations may consist of thin faeces, but blood and mucous, or slime, appear very soon and ultimately the motions consist of little else. There is pain in the abdomen, often fever, and the patient is very thirsty. Pain and lack of rest lead to much exhaustion and possibly collapse and death.

An acute attack of dysentery may terminate spontaneously but usually tends to become chronic ; the patient may have recurring bouts of diarrhoea, with the passage of slime and mucus, and be either apparently normal in the intervals or subject to constipation. Efficient treatment during the initial attack may cure the disorder, but sometimes recurrences take place even after such treatment ; or a patient, although he presents no symptoms of the disease, may still have the parasite in his body and thus be a danger to others. Various complications may occur including, in the amoebic form, inflammation or an abscess in the liver or in the brain.

Preventive treatment consists in destroying flies and preventing their access to food, using only boiled water for drinking and for washing food and food utensils, washing the hands scrupulously before taking food and preventing "carriers" from handling food intended for others. The motions of a person suffering from dysentery should be burnt.

During an attack of dysentery the patient should rest in bed and the diet to begin with should consist of albumen water, rice water and then arrowroot or cornflour. Milk should be withheld until the symptoms have abated. Abdominal pain is treated by hot poultices or fomentations. Medical treatment depends upon which parasite is responsible. For the amoebic form emetine hydrochloride or emetine bismuthous iodide is usually given, the former hypodermically, in doses of ½ grain twice daily, and the latter by the mouth, in doses of 1 grain twice daily, treatment in each instance lasting for about twelve days.

Bacillary dysentery is treated with magnesium sulphate, 60 to 120 grains, in water, every hour until the stools resume a faecal character, say for eight doses, and then at less frequent intervals. An antidysenteric serum, appropriate to the bacillus found to be present, or a mixed serum, is also used.

When there is no immediate means of finding out which type of dysentery is present, treatment by magnesium sulphate should be tried and a few doses of one of the emetine preparations, but the earliest opportunity of having the stools bacteriologically examined should be taken, even should the disease appear to be cured. *See* Beverages; Colitis; Flies; Ipecacuanha; Liver.

DYSMENORRHOEA. The onset of the menstrual flow is preceded in some women by a sense of weight in the pelvis, perhaps to an uncomfortable extent, which disappears, however, as the flow becomes established. Some women, on the other hand, experience a considerable degree of pain in the back and lower abdomen, preceding and accompanying the flow, and are then said to suffer from dysmenorrhoea. Mostly the pain takes the form of a dull ache, but along with this or independently there may be sharp, colicky pains. The aching is due to congestion of the internal genital organs, the colic to irregular spasmodic contractions of the womb in expelling the discharge.

The tendency to dysmenorrhoea will be lessened if girls and women exercise freely in the open air and take reasonable exercise during the periods. The bowels should be kept open and it may be desirable to take ¼ to ½ ounce of Epsom salts at the beginning of the period. If, however, the pain is very severe, rest is indicated. A hot bath often does good. Bromides, liquid extract of viburnum, aspirin and other drugs are sometimes required, but alcohol or opiates should not be taken as a habit may easily be induced. Organo-therapy may prove of great service. *See* Amenorrhoea; Guaiacum; Menstruation; Womb.

DYSPEPSIA. *See* Indigestion.

EAR: THE SOUNDBOX OF THE BODY

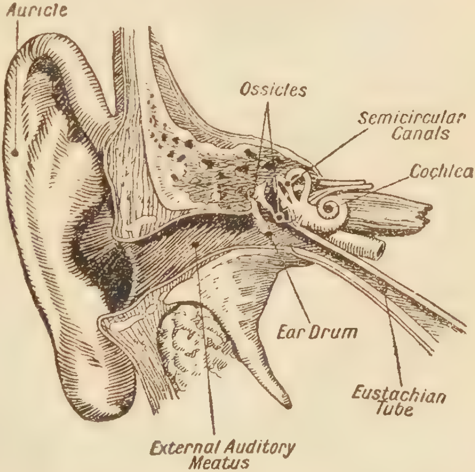
The Working of this Sensitive Instrument Explained

After explaining how sounds are transmitted to the brain via the ear, this article goes on to tell the various diseases which attack this organ and how they should be dealt with. See Deafness; Dizziness; Equilibrium; Eustachian Tube; Hearing; Mastoid; Noises in the Ear.

The hearing organ, or ear, is a mechanism by which air waves produced by vibrating bodies are communicated to the ends of a special nerve, the auditory, thus giving rise to impulses in the latter which are carried to the brain and there appreciated as sounds. It is customary to describe this mechanism as consisting of three parts, the external, the middle and the internal ear, though it must be understood that all these are continuous parts of the apparatus.

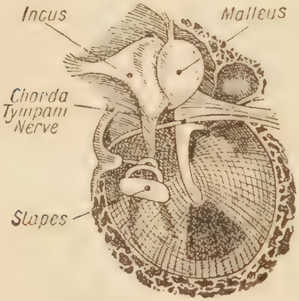
The external ear comprises the auricle, or pinna, the ear in the popular sense, and a passage, the external auditory meatus, leading inwards from this and ending at the ear drum or tympanic membrane. The external auditory meatus, about an inch long, is not a straight tube; about its middle it makes an upwards and also a backwards bend. In the skin lining the outer part there are modified sweat glands, secreting a thick yellowish waxy substance, known as cerumen.

The ear drum is firmly attached to the bony tube all round its circumference and has rather a slanting position, its lower margin being further in than the upper. Within the membrane is the middle ear, or tympanum, a cavity which is only $\frac{1}{12}$ inch across at its narrowest part and $\frac{1}{6}$ inch at the broadest; its height is about $\frac{1}{2}$ inch and the distance from before backwards rather more. Its principal contents are three tiny bones, or ossicles, namely, the malleus, or hammer; the incus, or anvil; and the stapes, or stirrup. The first is attached to the ear drum and is jointed to the incus, which in turn, is attached to



EAR. Sound waves pass along the external auditory meatus, reach the drum and set the ossicles in motion the stapes. The "foot-piece" of the last is fitted over a membrane which covers an opening in the inner, and bony, wall of the middle ear, known as the fenestra ovalis, or oval window. In front of this opening is the fenestra rotunda, or round window.

Into the front part of the cavity opens the Eustachian tube (q.v.) coming from the throat just behind the back opening of the nose. The uppermost part of the middle ear, known as the attic, presents at its back part the opening of a narrow canal leading into the mastoid antrum, a cavity in the upper part of the mastoid process, the nipple-shaped piece of bone at the back of the ear.

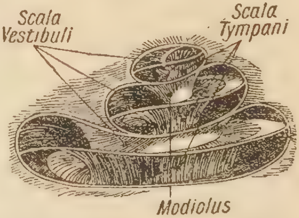


EAR. The ossicles which connect the drum with the internal ear

The internal ear or labyrinth consists of three parts; the cochlea, or hearing portion in front; the semi-circular canals, which are concerned in preserving the balance of the body; a space behind and between these known as the vestibule. All of these are hollowed out in the petrous portion of the temporal bone.

The cochlea, literally a snail shell, has its apex towards the inner wall of the middle ear and its base towards the inside of the skull. It consists of a passage comprising two and a half turns round a central pyramidal pillar, the modiolus. Projecting into the passage from the modiolus, all round the turns, is a little ledge of bone, the lamina spiralis, and this and a membrane, the basilar membrane, from its edge to the wall of the passage divides the latter into two divisions, one towards the apex, known as the scala vestibuli, and the other towards the base, the scala tympani.

Another membrane from the bony ledge cuts off a part of the scala vestibuli in order to form the canal of the cochlea; this is quite separate from the scalae but these communicate with each other at the apex of the cochlea. There is fluid in the scalae, the perilymph, which is continuous with fluid which is contained in the vestibule and which is also situated around the membranous semicircular canals.



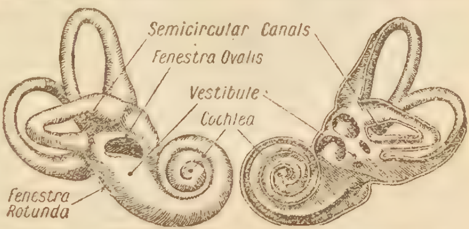
EAR. Section of the cochlea, the internal organ of hearing

Fluid in the canal of the cochlea, the endolymph, on the other hand, is continuous with fluid within the membranous semicircular canals. The lower end of the scala vestibuli is at the fenestra ovalis and of the scala tympani at the fenestra rotunda, which, it has been pointed out, are on the inner wall of the middle ear.

Along the canal of the cochlea, situated on the basilar membrane there is a structure, known as the organ of Corti, which is the essential organ of hearing. This is made up of several kinds of cells, including some which terminate in hairs projecting into the endolymph while their other ends come into relation with the ends of the cochlear nerve, which, passing up the centre of the modiolus, sends out branches all along the lamina spiralis.

When sound waves fall on the ear drum this is set vibrating, and with it the ossicles. The foot-piece of the stapes moves in and out of the fenestra ovalis, so altering the pressure of the perilymph in the vestibule; this alteration is communicated along the scala vestibuli and back along the scala tympani till it impinges on the elastic membrane covering the fenestra rotunda.

The changes in the scalae are communicated to the endolymph in the canal of the cochlea, so stimulating the hair cells, from which impulses are passed along the branches of the cochlear nerve. This nerve joins with the vestibular nerve from the semicircular canals to form the eighth cranial or auditory nerve, and impulses are thus carried to the bulb, or medulla, of the brain and thence to the transverse and superior temporal gyri of the large brain, a gyrus being one of the folds or convolutions into which the surface of the brain is folded.



EAR. Labyrinth of the ear (shown in section on right), the functions of which are concerned with balance and with hearing

DISEASES OF THE EAR. The auricle may be the seat of eczema or some other skin disease, and is particularly liable to frost bite. Gouty stones, or tophi, may form on it. As regards the external auditory meatus, the commonest abnormality is the accumulation of wax, which may cause itching, irritation or pain in the passage, cough, giddiness or deafness. Sometimes, from water being admitted and causing the wax to swell, symptoms may arise.

No attempt should be made to dig out the wax with a hairpin or any other instrument, for fear of injuring the ear drum; but, after dropping in some warm almond or olive oil or solution of bicarbonate of soda and waiting for a little, a cautious attempt may be made to dislodge the wax by syringing. Ordinary warm water should be used and a small glass syringe; the larger brass type of syringe is really too powerful to be used for this purpose except by the experienced.

A large soft towel is placed about the patient's shoulders, and a bowl is held beneath the ear and in contact with the cheek to catch the water as it runs away. The auricle is drawn upwards and backwards, and the jet of water is directed from the nozzle of the syringe, which is held at the earhole but not actually in it, against the back wall of the passage. This is continued until all the wax appears to have been dislodged, but if there is difficulty in stirring the plug it is safer to put in more oil and, after some hours, syringe again; if this fails a doctor should be consulted.

Children sometimes put beads or other objects into their ears, and here again syringing is the correct treatment, but should, if possible, be done by a doctor. If the foreign body is a pea, or anything else likely to swell from contact with water, no water should be admitted to the ear by syringing or otherwise, but a little oil may be dropped in pending the services of a doctor.

The meatus may be the site of eczema, and the cause of this may be a purulent discharge from the middle ear, though poking in the ear with pins is one of the possible causes. There is heat, itching and more or less of a sticky discharge, and scratching aggravates the condition. A boil or furuncle may form in the passage, and may cause great pain and constitutional symptoms, suggesting perhaps the possibility of mastoid disease. Another painful complaint is myringitis, or inflammation of the ear drum. The drum may be ruptured by violence; by diving, for example, by a box on the ear or by an instrument driven along the meatus. There is pain accompanying and following the accident, and the discharge of a little blood. All these conditions require immediate treatment.

Catarrh in the Eustachian tube may block this passage and cause deafness by preventing the admission of air into the middle ear; but the catarrh may also spread right up the tube into the ear itself. This may cause acute pain and more or less fever. The middle ear, which, it has been noted, is a very small cavity with rigid walls except for the ear drum, becomes occupied by inflammatory discharge. This may actually be pus, a likely contingency when the ear trouble occurs as a complication of measles, scarlet fever, influenza and other diseases. In these circumstances it should be remembered also that adenoids, unhealthy tonsils and septic conditions about the nose and mouth generally, predispose to ear complications, and may themselves be responsible for recurring septic catarrh in the Eustachian tube and middle ear.

When acute catarrh has invaded the ear some relief from pain may be secured by hot applications over the ear, or by dropping some warm water or some medicated liquid into the ear. The hot application may be a linseed poultice, a hot-water bag, common salt heated on a shovel and put into a flannel bag, or a big potato boiled in its jacket and wrapped in flannel can be used. When the drum ruptures, allowing the escape of the imprisoned discharge, there is usually immediate relief from pain; but it is dangerous to wait for this, because the pent-up infection may spread.

Persons suffering from pain in the ear, either in connexion with the diseases mentioned or otherwise, which does not quickly disappear when treated with warmth, should be under expert care, so that, if necessary, an opening may be made in the ear drum to allow the discharge to escape. Besides minimising the risk of extension of the infection to the mastoid antrum and other surrounding parts, prompt interference of this kind will lessen the risk of the disease assuming a chronic form, either as a catarrhal or a suppurative otitis media. In the latter condition the continuance of the suppurative process entails serious consequences and risks.

The general health may be affected by the absorption of toxins into the blood. The constant flow of purulent discharge may occasion eczema or boils in the ear passage. There is an ever-present risk of acute suppurative mischief in the mastoid antrum and in the cells, or tiny spaces, in the mastoid process; thence there may be extension outwards, forming an abscess over the mastoid process or in the neck, or there may be an extension inwards destroying the internal ear, causing infective thrombosis in the lateral sinus, meningitis or a brain abscess. An earnest endeavour must therefore be made to prevent the discharge from becoming chronic, and to cleanse the ear should a chronic discharge exist.

Either aspect of the case requires expert advice and supervision. For cleansing, a common method is as follows: the ear is syringed gently with a warm boracic solution, at least once a day, and when the outflow is clear the ear is drained by bending over the head on the affected side, and then dried by means of a tiny mop of cotton wool on a splinter of wood. The cotton wool must project well beyond the end of the splinter. A few drops of a solution of boracic acid powder in rectified spirits, 10 grains to the ounce, are then instilled into the ear, or some of the powder is blown in by insufflation (q.v.). A small pad of cotton wool may be applied over the earhole, but on no account should this be blocked by a plug of cotton wool.

In all cases of chronic suppuration in the ear it is necessary to make sure that there is no obstruction in the nose or pharynx, and no lurking sepsis there or in the mouth; the possibility of sepsis about the teeth, for example, should be investigated.

The middle ear may be the site of chronic non-suppurative inflammatory processes which, while they do not menace life as does the suppurative form, yet are very serious because of their lessening or even destroying the hearing. In one form there is exudation into the ear. The beginnings may date back to scarlet fever or measles in childhood, or to some other circumstances leading to sepsis in the nose and throat. The most important item of treatment is opening the drum so as to allow the exudation to run off, and this should be done by an expert whenever there is reason to believe that exudation is present. The potency of the Eustachian tube must also be ensured by inflating it with a Politzer bag. The nose and throat must be cleaned up if necessary, and this is also important in prevention.

In middle-aged people a type of otitis media in which there is no exudation is more common; this is sometimes called otosclerosis, and the main feature of it is thickening of the bony walls of the middle ear. In some cases of ear trouble the underlying cause is tuberculosis or syphilis, and in other instances general diseases like anaemia may aggravate a local disorder; in all such cases appropriate general treatment is also required.

EAR-ACHE. Pain in the ear may be due to the pressure of foreign bodies in the passage, or to inflammation there or in the middle ear. Children with ear-ache should have immediate medical care, as timely interference may prevent possible extension of septic mischief to the mastoid region and would often prevent serious loss of hearing in later life. Ear-ache is sometimes due to the presence of decay in the back teeth. Treatment depends on the cause, but hot applications are useful in relieving pain temporarily. Such an application might consist of a small flannel bag filled with common salt which has been heated in a shovel. *See* Ear.

EASTON'S SYRUP. Syrup of iron phosphate with quinine and strychnine, or Easton's syrup, is well known as a nervine and general tonic. It is often of use in carrying one through a period of physical or mental strain, such as during the last weeks before an examination, and in convalescence from debilitating diseases. The dose is ½ to 1 drachm. Those who object to the bitter taste of the syrup can obtain its equivalents in tablet form. These tablets should never be left within reach of children, as fatal strychnine poisoning has occurred from neglect of this precaution. *See* Strychnine; Tonic.

EATING. While it may be correct to say that one should eat when hungry, this does not mean that there should be anything haphazard about the choice of meal times. The digestive apparatus, like most things in nature, is subject to habit, and irregularity as regards meals is likely to upset its function. The principal meal of the day should be taken when circumstances favour its digestion, and this for hard-working people is usually at the end of the day. A short rest after hard work and before taking a meal helps to encourage appetite.

What matters at a meal is whether eating is properly performed. Satisfactory mastication requires, first, a sufficiency of teeth, and, second, sufficient time devoted to chewing; it can hardly be satisfactory if liquids are taken while food is in the mouth, as much half-chewed food is thus washed down. The inclusion of firm food in the meal has the further advantage that it helps to keep the teeth clean, and an apple at the end of a meal is excellent on this account.

Thirst may be relieved by taking liquids at the end of a meal, though the best time is between meals, as the addition of much liquid during the digestion of a meal may be harmful by diluting the gastric juice. The most important precaution with regard to liquids is to keep them out of the mouth while chewing food.

It is often said that one should rise from a meal with an appetite, and certainly no meal should be continued until no more can be taken. Strenuous physical or intellectual work should not be undertaken just after a meal ; a half-hour's rest will help digestion by preventing blood necessary for that purpose from being withdrawn for the exercise of brain or brawn. *See* Appetite ; Diet ; Digestion ; Indigestion.

EAU-DE-COLOGNE. A spiritous preparation containing oil of rosemary and other essential oils, eau-de-Cologne is very useful in the sick room. Its addition to the water used for washing or sponging a patient makes this more cooling and refreshing. With a little water it may also be used to make an evaporating lotion out of which one or two layers of gauze are wrung and applied to the forehead, or inflamed joint, or wherever cooling is required.

The toilet uses of eau-de-Cologne are many. Rubbed into the palms of the hands after washing and drying them, it keeps them free from perspiration in hot weather. It is a good facial astringent for use about once a week. A pad of cotton wool should be squeezed out of cold water and then further moistened with eau-de-Cologne. The face should be briskly patted with this pad and then sponged with cold water. Skin food may be applied afterwards at night. Eau-de-Cologne is refreshing on a railway journey and, in addition, does much to alleviate a headache. *See* Nursing.

ECLAMPSIA. Sometimes the ordinary course of pregnancy, especially the first, is interrupted by eclampsia, or the occurrence of fits which resemble those of epilepsy. They are most common in the last three months ; they may not begin till the woman is actually in labour or even until labour is over, when the condition is called puerperal eclampsia.

Eclampsia is due to poisoning consequent on the presence of the child in the womb ; but the only thing that is definitely known about the nature of this poisoning is that the kidneys do not function properly, and that albumin is present in the urine. Very often there are symptoms pointing to the possibility of eclampsia, such as flashes of light before the eyes, dimness of vision or even temporary blindness, persistent headache, persistent indigestion, or diminution of the amount of urine passed in the 24 hours. A pregnant woman should keep in touch with her medical attendant and should report abnormal circumstances to him.

A fit is ushered in with a cry and the face begins to twitch. Soon the whole body becomes rigid and, from interference with breathing, the face becomes dusky ; the teeth are tightly clenched and the tongue may be caught between them. After about 1½ minutes rapid spasmodic movements begin, and these last for 2 or 3 minutes, and when they cease the patient lies in a comatose state.

Medical assistance should be summoned at once. Meanwhile, the patient should be extended at full length on the ground or in bed, if she happens to be there, and turned on one side. This is very important indeed, for if she lies on her back saliva may be drawn into the windpipe and may choke her. A piece of wood or the handle of a spoon wrapped in a handkerchief should be inserted between the back teeth on one side to prevent biting of the tongue. Clothing about the neck, chest and waist should be loosened in order to allow free breathing. The movements should be restrained sufficiently to prevent the patient from hurting herself, but no forcible attempt should be made to suppress them entirely. There may be only one fit or very many, and they may occur in rapid succession.

If medical help is delayed, an attempt may be made to prevent the recurrence of the fits by putting an ice-bag at the back of the head and neck and by fomentations or poultices over the kidneys, and the patient should be kept warm with hot-water bottles and blankets in order to encourage sweating. If the patient is conscious, half an ounce of Epsom salts should be given dissolved in a little water, and this dose may be repeated in an hour. *See* Childbirth; Pregnancy.

ECZEMA. Eczema is an inflammation of the skin, but it is a capricious disorder compared with simple dermatitis (q.v.); it may come into existence for no obvious reason, and in the course of treatment may relapse on slight, or even no apparent, provocation.

It is thought that the skin is sensitised to some substance which may reach it by the blood or come into contact with it, and that the manifestations of eczema are, as it were, explosive phenomena comparable to those of an attack of asthma. Sometimes attacks of asthma and eczema alternate, or they may occur together.

In asthma it is recognized that an attack is often precipitated by the patient swallowing some food, such as an egg, or inhaling horse-dandruff or some other substance, and the same may apply to an outbreak of eczema. In both cases also the liability to the disease may be inherited. In creating this tendency to eczema or in provoking an attack, it is thought that the poisons manufactured in the patient's alimentary tract, or toxins coming from some focus of infection somewhere in his body, may sometimes play a part. Local irritation may also be of importance in precipitating an attack in some people; in others sunlight, coarse soap, sugar and so on.

Acute eczema oftenest appears first on the face. The skin becomes reddened, swollen and itchy, and then hot and tense. Blisters then appear, tiny at first, but perhaps coalescing to form larger ones. Itching is a prominent symptom in most cases of eczema, and either by scratching, or spontaneously, the blisters rupture and pour out a clear sticky discharge which is characterized by the fact that it stiffens linen like starch.

Later the discharge dries into yellow crusts, or, if blood has been drawn by scratching, the crusts are brown. After a few days the swelling abates, the crusts drop off, and there remains a reddened and scaly surface. Scaling goes on for a few days or even weeks, and the skin then resumes its normal appearance. But during this time some article of food or some application may cause a relapse, and the various stages are repeated.

The disease may spread from the face, or wherever it begins first, to other parts, and especially in children, may cover the whole body. If much skin is involved there may be fever and loss of appetite. While the skin is inflamed it is readily invaded by microbes which may cause pustules like those of impetigo, crops of boils, or perhaps erysipelas.

The general treatment should include a scrutiny of the diet, and, if there are successive attacks, it may be possible to fix responsibility on some particular item. In severe cases a light milk diet with vegetable soups is usually given. Water, barley water, or a natural alkaline water should be given very freely. When the disease is more localised, a grilled mutton chop and vegetables are usually safe. Alcohol, tea and coffee are not allowed. Clothing next to the skin should be of the cellular cotton type, with only sufficient bed and personal clothing to keep the patient comfortably warm. The bowels should be kept freely open by giving salines.

The kind of local treatment depends on the stage of the disease. In the weeping stage, that is, when there is discharge, some doctors use drying pastes or powder, but most use lotions. A good one consists of the dilute liquor of lead acetate, B.P., or one made by shaking up ½ ounce each of powdered zinc oxide and prepared calamine, and ½ ounce of glycerin with a pint of distilled water.

These lotions are applied on strips of butter-cloth or linen which should not be allowed to become dry, though it is better not to cover them over with any impermeable protective. Greasy applications are harmful at this stage as a rule, especially if there is any pus in the discharge. If there is much crusting, this can be removed by applying a starch poultice ; this is made by mixing a tablespoonful of wheat starch into a paste with a little cold water, pouring it into a pint of boiling water, and stirring briskly to mix thoroughly. The starch, when cool, is applied on pieces of linen, the surface having first been sprinkled with boracic acid powder.

Throughout the treatment plain water should not be used for cleansing, the lotion or a starch poultice sufficing in the early stages ; later, when ointments or pastes are being used, cold cream or oil of sweet almonds will be suitable cleansing agents.

In a type of disease known as seborrhoeic eczema, thorough washing of the skin, on the contrary, is of the utmost importance. A change is made to creams, ointments or pastes when the weeping stage is over, Lassar's paste (q.v.) often being used at this stage.

Chronic eczema may follow an acute attack, but most frequently begins as such, that is to say, the lesions on the skin appear without the dramatic suddenness of the acute type. In one case the disease may mainly be of the weeping form, in another dry and scaly, while in a third the chief tendency is towards the development of groups of papules, or pimples. In all cases, however, there is more or less thickening of the skin, and often fissures or cracks are present. There is usually intense itching, increased by warmth, so that it may become intolerable when in bed at night.

For the weeping type the lotions already mentioned may be tried, with the addition of 2 drachms of liquor carbonis detergens to the ½ pint. When there are cracks, painting with a solution of 15 grains of silver nitrate in 1 ounce of sweet spirit of nitre is very effective, care being taken to avoid the sound skin, which would be blackened. In any case it is desirable to protect the sound skin around the patches with Lassar's paste, whatever the treatment used for the patches. It is often sound treatment to paint the patches (and this applies also to other types of chronic eczema) with pure tar, pix carbonis praeparata B.P.; itching may be wonderfully relieved by this application.

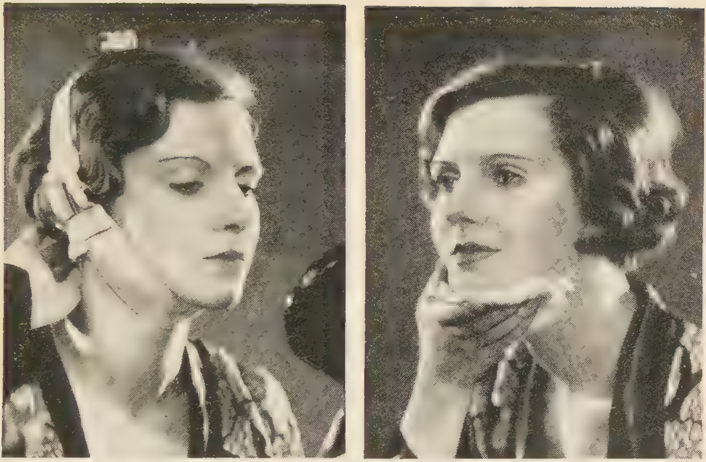
In the treatment of dry and papular eczema, ointments or pastes containing tar, ichythol, juniper tar oil or something similar may be used. The following is an example of a suitable formula:

Liquor carbonis detergens	1 drachm
Zinc oxide powder	120 grains
Powdered starch	120 grains
Vaseline and lanolin equally to make	1 ounce

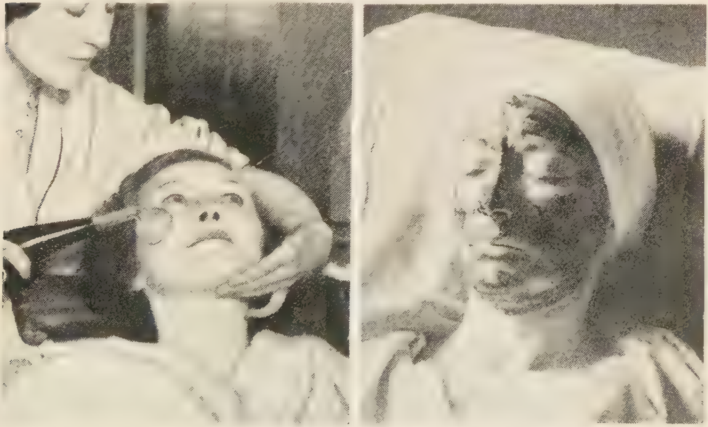
Radium, X-rays and ultra-violet rays, when used by experts, are often of much service in obstinate cases of chronic eczema. *See* Dermatitis; Seborrhoea; Skin.

EGG. An egg contains only an insignificant amount of carbohydrates, so little that eggs are allowable for diabetics on a strict diet; on the other hand, an egg is relatively rich in iron and in lecithin, a phosphorised fat, which is found in large quantity in nervous tissues. It has a liberal content of lime also. It is thus a good food for the growing person and in anaemia; it is useful also in tuberculosis and in convalescence from acute diseases. The white of the egg, or egg-albumin, is almost a pure solution of proteins, chiefly albumin; fat, lecithin, cholesterol, a protein called vitellin, vitamin and mineral salts are contained in the yolk.

The digestibility of white of egg is increased by whisking it. A hard-boiled egg takes about twice as long to digest as a lightly

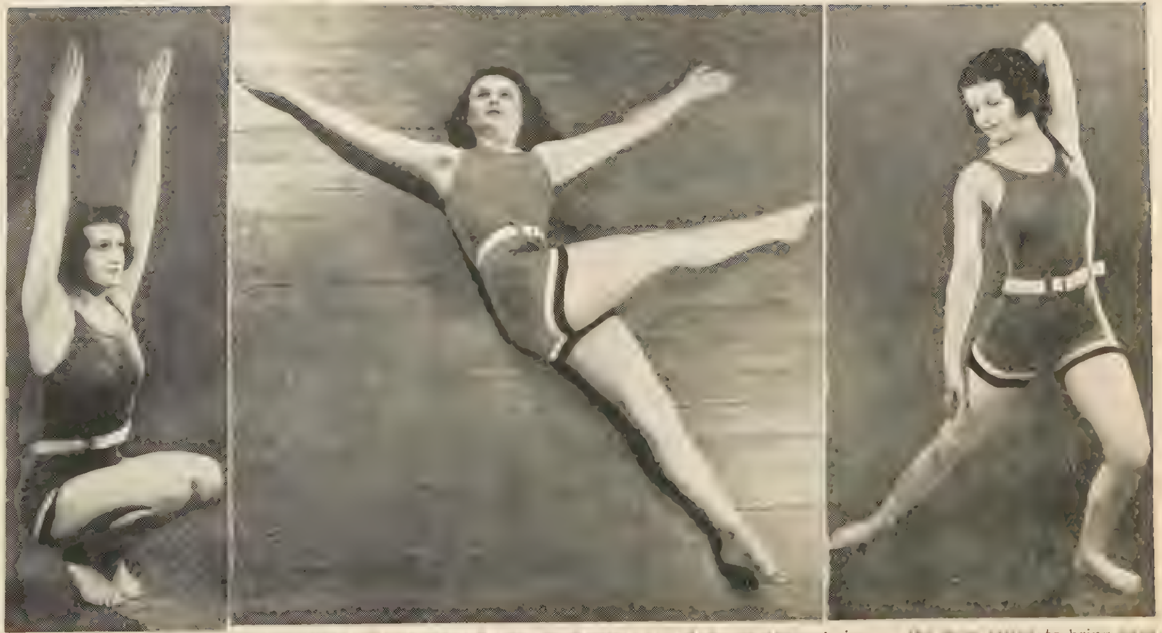


Left. A chin strap which helps to correct flabbiness, sagging of flesh at the points of the jaw, and to ward off a double chin. Right. A treatment to be applied daily with cotton wool soaked in an astringent. This is briskly patted till a reaction is felt



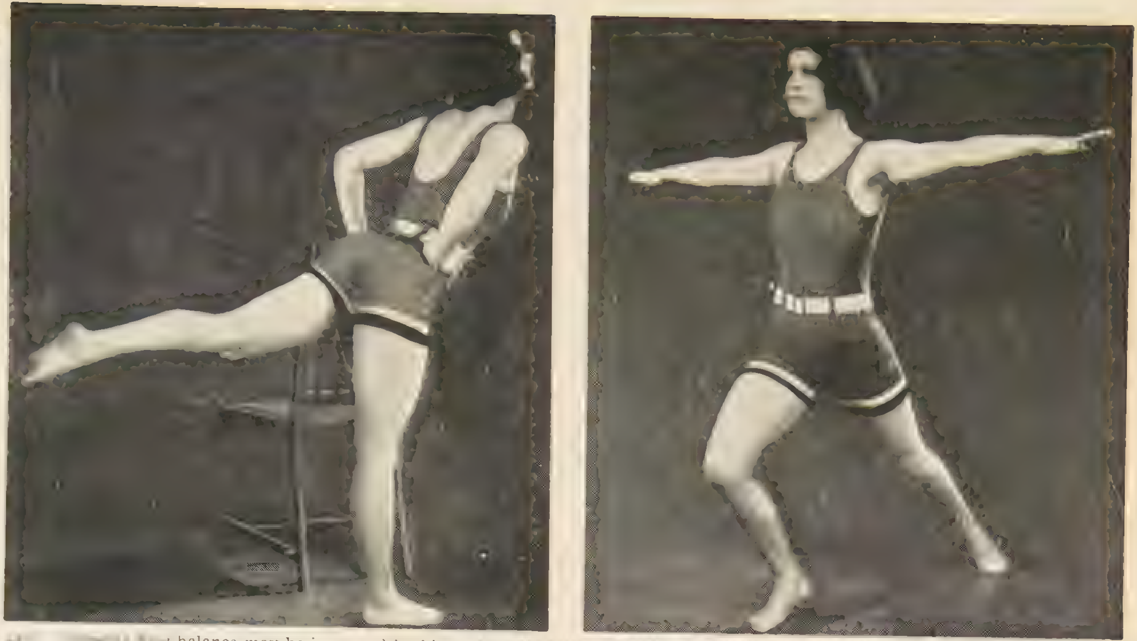
Left. This treatment, applied by some beauty specialists, consists of a form of superficial massage combined with ultra-violet radiation. It is intended to remove skin blemishes and unwanted flesh. Right. A mud pack used to purify the skin

TREATMENT FOR BEAUTIFYING THE FACE



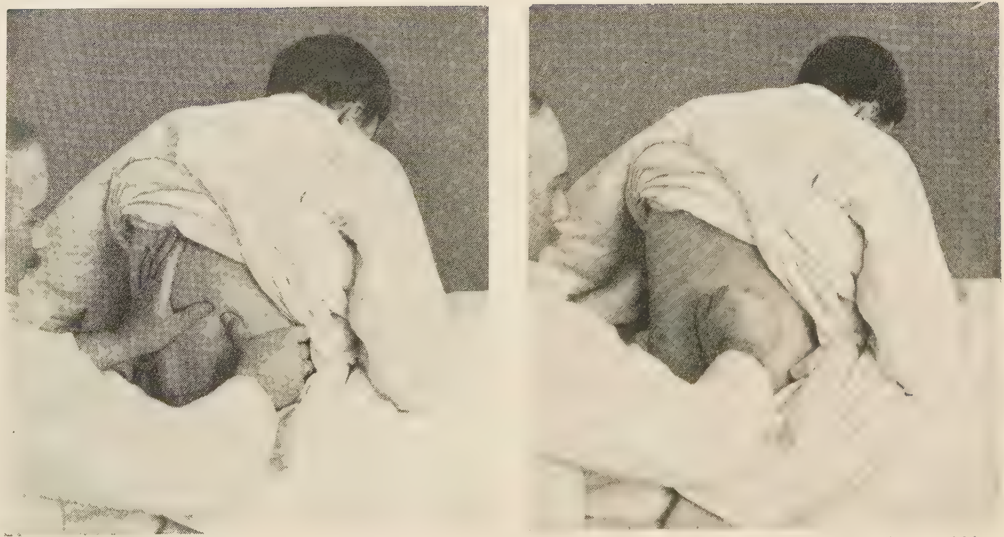
Left. Poise and flexibility are improved by knee bending with arms extended. Centre. Lying on the floor, trying to bring each leg in turn near the outstretched hand. Right. [illegible] by improving the carriage of the shoulders.

HELPFUL EXERCISES FOR THE IMPROVEMENT OF THE FIGURE



[illegible] balance may be improved by hip and [illegible] which will be helpful towards good carriage of the body. [illegible]

EXERCISES FOR IMPROVING THE GRACE AND CARRIAGE OF THE BODY



The pain is due to nodules in the tissues pressing upon the nerves. When these have been diminished by light rubbing deep pressure with the thumbs is used (left) and then (right) massage with the closed fist

FIBROSITIS : TREATING IT BY MEANS OF MASSAGE

boiled one, but its digestibility can be increased by mincing finely. Eggs may have a constipating effect, possibly because they leave hardly any residue in the bowel and contain lime. *See* Albumin; Beverages; Food; Invalid Cookery.

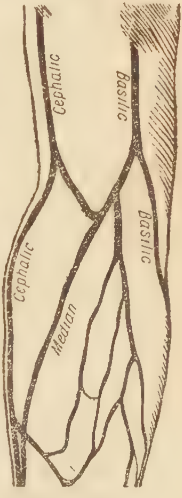
ELASTIC BANDAGE. Included in this description are the pure rubber, or Martin's bandage, the woven elastic and the crêpe bandage. Any of these may be used to support varicose veins, but the pure rubber has the disadvantage that it imprisons the sweat and so may cause much irritation. To lessen this risk perforated pure rubber bandages are sold. A bandage is a better support for varicose veins than an elastic stocking, but should be put on evenly from the foot upwards and before getting out of bed in the morning; nor should it be removed until in bed again.

Another use for an elastic bandage is to support and exercise pressure on an injured joint; it should be put on as a figure-of-eight. The pure rubber or woven elastic bandage is often used to compress the blood vessels and control bleeding during an operation, and in delayed union of bones, after a fracture or other affections of a limb. *See* Bandage; Bier's Method.

ELBOW. On the front of the elbow there are several large veins just beneath the skin. One, the basilic, runs upwards in the groove on the inner side of the biceps muscle, and another, the cephalic, occupies the groove on the outer side of the muscle. Crossing the front of the elbow, running obliquely upwards and inwards from the cephalic to the basilic, is the median vein. These are the veins almost always used for blood-letting and for intravenous injections. The brachial artery divides into the radial and ulnar arteries about a finger-breadth below the bend of the elbow.

The bones forming the elbow joint are the humerus above and the radius and ulna below. The upper end of the ulna possesses a notch which grasps the lower end of the humerus, the upper, or back, part of the notch being formed by the olecranon process, and the lower, or front, part by the coronoid process. The olecranon process forms the point of the elbow.

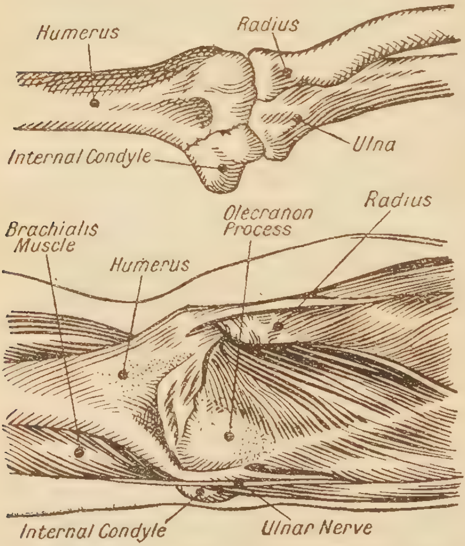
The elbow is a good example of a simple hinge joint, possessing only the movements of flexion, or bending the arm, and extension, or straightening it out. It does not move from side to side. When the forearm has been straightened out till it is in line with the arm, it is prevented from going any further by the olecranon process



ELBOW. Veins of the arm that cross the front of this region fitting into a depression on the back of the lower end of the humerus known as the olecranon fossa.

The elbow joint may be sprained or dislocated, or the bones may be broken in its neighbourhood. A dislocation of both bones is usually backwards, the elbow being more or less fixed with the olecranon process very prominent. A fracture of the bones near the joint may extend into the latter, or otherwise threaten its future mobility. The first-aid treatment of these accidents is described under the headings Dislocation, Fracture and Sprain, and diseases under the heading Joint.

What is called a tennis elbow is usually either a strain of the muscle on the outer side of the elbow in front, or inflammation of a bursa (q.v.) which lies beneath those muscles. It may be caused by an over-powerful backhand stroke or by continuous overstrain of the muscles in such strokes. The usual treatment is to fix the elbow with strips of adhesive plaster, but if there is an inflamed bursa it may require operation.



ELBOW. Above, fracture of humerus involving elbow joint. Below, muscles on outer side of right elbow, showing position of ulnar nerve or "funny bone"

There is also a bursa between the olecranon process and the skin to relieve pressure on the former when the elbow is rested on a hard surface. Swelling of this bursa is described as student's elbow or miner's elbow, and is similar to a housemaid's knee.

The ulnar nerve runs at the back of the elbow between the olecranon process and the inner prominence, or condylar process, of the lower end of the humerus. It lies close to the skin and may readily be jarred by knocking this part of the arm against some hard corner, when a peculiar sensation runs down the forearm. Hence the name funny bone applied to this part of the elbow. *See* Dislocation; Fracture; Joint; Sprain.

ELECTRICITY. The best-known forms of electricity that are employed in medicine are those of galvanism and faradism. The former is constant current electricity; the latter is an induced current of an alternating nature. An alternating current in which the alternations take place very smoothly is known as the sinusoidal current. A high-frequency current is one which reverses the direction of its flow so rapidly that there may be as many as two million alternations per second. Diathermy, which is a heat-producing agent, is carried out by an intense current of this description.

It is not possible in a work of this kind to enter into technical details regarding the sources and methods of applying these currents, but their uses will be indicated.

The galvanic current is used in ionisation (q.v.) ; for treating neurasthenia and other constitutional diseases ; to stimulate paralysed muscles ; for nerve and muscle testing ; in electrolysis for the removal of birth marks and superfluous hairs.

The faradic current is of value in the regeneration of wasted muscles ; in obesity, this form of electricity being used in the Bergonié method ; and in certain gynaecological conditions.

The sinusoidal current is used for prolapse of the abdominal viscera ; in constipation ; for threatened curvature of the spine in growing children ; for difficult and painful menstruation.

High frequency is especially valuable in conditions of pain and congestion, and in treating skin lesions such as boils and ulcers. Diathermy is used to destroy piles and various kinds of tumours ; to increase metabolism ; to relieve neuritis ; in pneumonia, and for other purposes.

The application of electricity to the diagnosis and treatment of disease can only be carried out properly by a doctor or under his immediate supervision. *See* Ionisation ; Radiant Heat ; X-Rays.

ELECTRIC SHOCK. A severe electric shock causes a person to cry out, and he may fall to the ground and stop breathing. If he remains in contact with a live wire the current should be turned off. If this cannot be done at once, his connexion with the wire should be broken ; but proper precautions must be taken in doing so. The rescuer should stand on a pile of dry clothing, if a dry rubber mat is not available, and his hands should be covered with rubber gloves, tobacco pouches or dry woollen clothing. A dry stick, if at hand, may be used to push the wire off the body. It will be noted that emphasis is laid on everything used in connexion with the rescue being dry ; moisture conducts electricity very readily.

If the patient has stopped breathing, artificial respiration (q.v.) should be carried out. Smelling salts may be held to the nose, or if the patient can swallow he may be given diluted spirits of sal volatile. He should be kept as warm as possible.

ELECTROLYSIS. If a current is passed through body tissues, caustic soda is formed at the negative pole and hydrochloric acid at the positive, either of these substances having a caustic effect. If, therefore, a current is passed through a naevus, a form of birth mark (q.v.), or a wart, there is coagulation of the blood and the growth atrophies and disappears. Similarly, when a platinum needle attached to the negative pole is pushed into a hair follicle, while the positive electrode is placed somewhere else on the body and an electric current passed through, the root of the hair is destroyed and superfluous hairs can be thus removed. Only large, coarse hairs are dealt with by electrolysis.

This method of treatment should be done by an expert. The inexperienced may either fail to remove the blemish or may cause excessive destruction which is followed by disfiguring scars.

ELEPHANTIASIS. The tropical disease known as elephantiasis, or Barbados leg, owes its name to the enormous swelling which may affect the legs, the scrotum, the vulva, or, more rarely, the breasts, face or arms of those who are its victims. It is the result of inflammatory overgrowth and obstruction to drainage through the lymphatic channels, caused by a parasitic worm, filaria bancrofti, the adults of which, from 3 to 4 inches long, inhabit the lymphatics.

The production of swelling is preceded by inflammation and by bouts of feverishness. The increase in size is accompanied by coarsening of the skin, which also forms more or less massive folds at the joints of an affected limb, especially at the ankle. Very great deformity and incapacitation often occurs. While the progress of the disease can be delayed, perhaps, by resting with the limb elevated and by the use of an elastic bandage, surgical treatment is usually required sooner or later and this may mean an amputation. Success in diminishing the number of the parasites and lessening the swelling has been claimed for treatment by intravenous injections of tartar emetic. *See* Dropsy ; Filaria ; Lymphatic System.

EMACIATION. Severe general wasting of the body, or emaciation, may occur from a variety of causes. It may happen quickly from a large loss of liquid by watery motions, as in cholera and the summer diarrhoea of infants, a loss, however, which is quickly made up if the patient recovers. It may happen fairly quickly also from the burning up of the tissues in fevers, or from the active chemical changes in exophthalmic goitre.

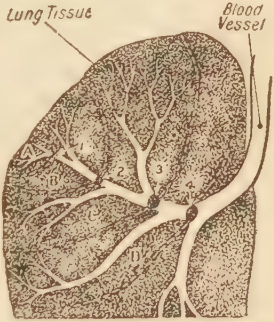
There may be much emaciation in diabetes. Malignant tumours are another cause. Tuberculosis of the lungs owes its other names, consumption and phthisis, to the emaciation which it causes. Syphilis may have the same effect, and emaciation in young children is a common symptom of the inherited disease.

A person suffering from melancholia may be very much wasted, also one in the later stages of locomotor ataxia, and the instances of emaciation exhibited to the public as living skeletons are victims of a degenerative disease of the muscles. *See* Atrophy ; Starvation.

EMBOLISM. Sometimes there are particles floating in the blood which are able to block blood vessels, or, to use the scientific name for this occurrence, to cause embolism, the plug itself being called an embolus. With the exception of the branches of the portal vein, which in the liver become smaller and smaller and end in capillaries, it is always an artery that is blocked, and generally one of the smaller of these.

Most commonly the embolus is a piece of thrombus, by which is meant a clot formed in a vein or in the heart, or it may be a vegetation, a small fibrous mass, which has been detached from a diseased heart valve. Clotting, or thrombosis, is not uncommon in a varicose vein and it always takes place extensively in the veins of the womb after childbirth, and it sometimes happens that a portion of the thrombus breaks off, floats up through the great veins, through the right side of the heart, and lodges in one of the branches of the pulmonary artery. Similarly a thrombus from one of the tributaries of the portal vein may lodge in the liver.

After a fracture, fat globules may occur in the blood, as they may in other conditions, and after a wound in a large vein, especially of the neck, or after labour, air may make its way into a vein. Either the fat or the air may act as an embolus. Other emboli consist of parasitic worms or portions of malignant tumours, and wherever the embolus of tumour tissue lodges a fresh growth begins.



EMBOLI, numbered 1-4, are shown blocking blood vessels which serve the lung areas A-D

Sometimes an embolus is infected with bacteria; it is then likely that an abscess will form at the site of the embolism and that further particles will be detached from the abscess and spread widely over the body, each giving rise to an abscess where it comes to rest.

Apart from this possibility of infection, the consequences of embolism depend upon its situation, the organ in which it occurs, and the size of the artery which is blocked. Where there is free anastomosis of the arteries, that is, where their branches intercommunicate freely, the stopping of the circulation beyond the plug is very short, because blood flows in from neighbouring blood vessels. But in certain situations there is so little anastomosis that the arteries may be termed end arteries. The coronary arteries which supply the heart are of this description, and embolism of one of these means sudden death. This might also occur were a considerable branch of the pulmonary artery in a lung the site of embolism.

In the eye embolism causes sudden and permanent blindness, and in the brain the commonest result is sudden paralysis of one side of the body. Other end arteries occur in the spleen and the kidney, and embolism causes pain over the organ involved.

The recognition of the occurrence of an embolism is not likely to be possible for any but a doctor. The possibility of its occurrence in connexion with heart disease or venous thrombosis and after labour should be borne in mind; a person with heart disease should abstain from violent, or even much, effort, and in the other cases mentioned strict rest should be enjoined as long as the danger lasts. *See* Apoplexy; Infarction; Pyaemia; Thrombosis; Varicose Vein.

EMBROCATION. *See* Liniment.

EMETIC. A substance which causes emesis, or vomiting, is described as an emetic. The stomach should be emptied at once when an irritant or narcotic poison has been taken, and it devolves on those who are at hand to give an emetic, which should be the first procurable. An emetic should not be given, however, if there are stains or other evidences pointing to the poison as belonging to the corrosive group.

It is often desirable also to induce vomiting in cases of gastritis and thus get rid of irritating substances. Another circumstance in which vomiting may be useful is in bronchitis, when the bronchial tubes are filled with secretion, which may be cleared in this way.

The handiest emetics are common salt, two tablespoonfuls in sufficient water just to dissolve it, and mustard, a tablespoonful in half a tumbler of water. A teaspoonful of alum in half a glass of water would also act. Zinc sulphate, 10 to 30 grains, and copper sulphate, 5 to 10 grains, dissolved in water are rapid emetics. Ipecacuanha wine is somewhat slow in its action; the doses are two tablespoonsful for an adult and a small teaspoonful for a child. Apomorphine, which is derived from morphine, is a rapid and reliable emetic; it is given hypodermically. For elderly people suffering from bronchitis, ammonium carbonate, in a dose of 10 grains in water, is a good emetic for clearing the tubes, as it does not cause the depression which follows most other emetics and which would be dangerous to one in an enfeebled state.

It will probably be found that tickling the back of the throat with a feather, the finger or a paper spill will succeed in bringing an emetic into action. When vomiting begins it should be encouraged by giving large draughts of tepid water, and this will further benefit by washing out the stomach. *See* Apomorphine; Copper; Poisoning; Stomach Pump; Vomiting.

EMPHYSEMA. The tiny air vesicles of the lung and the passages leading into them have elastic walls, so that, while they expand when air is drawn into the chest, they shrink again when air is expelled. Should they remain more or less dilated, however, the affected part of the lung is said to be in a state of emphysema. As the disease advances the vesicles become more and more dilated, their walls atrophy and give way, so that large air spaces form, sometimes as large as a hen's egg.

The subdivision of the normal lung into minute air cells provides an increased surface in which blood capillaries may run and so increases the opportunity for aeration of the blood; their destruction in emphysema results, therefore, in insufficient aeration of blood. Two consequences of this are that the patient is short of breath and cyanosed, though in some instances he may be very dusky but not so short of breath as would be expected from his appearance.

The enlargement of the lung pushes up the ribs so that the chest tends to be round or barrel-shaped, and there is also a tendency to be round-shouldered.

The subjects of emphysema suffer from chronic bronchitis, more particularly in the winter. The diminution of the available capillary blood vessels in the lungs means that the right heart has to work harder in order to push the blood through. In order to overcome its difficulties it hypertrophies, but as years go on it tires, becomes dilated and inefficient, so that dropsy and other sighs of heart failure appear. People with emphysema are ill-prepared to resist pneumonia.

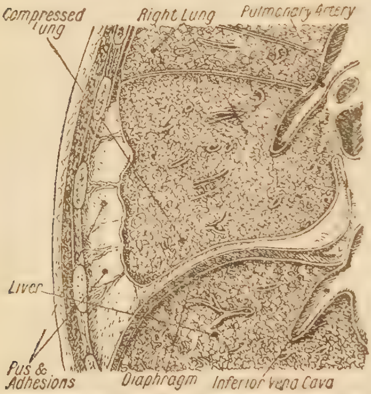
Anything that raises the pressure within the lungs tends to produce emphysema. Hard physical toil, involving much holding of the breath, will do it, and occupations such as glass-blowing and playing on wind instruments. In asthma forcible efforts have to be made to expel air from the lungs, and in chronic bronchitis the stress of cough strains the lungs, though both of these conditions may also be effects of emphysema as well as causes. It is thought that some people are born with deficient elasticity in their lungs so that they are therefore liable to develop emphysema very readily and even be affected with it in childhood.

An emphysematous state of the lung cannot be removed, but something can be done to prevent it from getting worse. If at all possible a change should be made from an occupation involving straining efforts to one which does not; much stair climbing should be avoided and also exercises which put one out of breath. Dusty occupations should be eschewed, as they are provocative of bronchitis and fibrosis of the lung, and for the same reason it is desirable to winter somewhere away from the cold and damp and the fog of cities.

The risk of bronchitis will be lessened by keeping the chest well covered, front and back, by avoiding quick changes from a hot to a cold atmosphere, by simple food in a moderate quantity and by strict moderation in the use of alcohol. Bronchitis should be treated as described under that heading. *See* Bronchitis; Cyanosis; Lung.

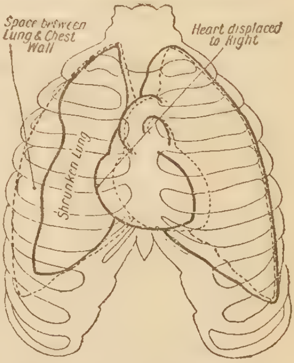
EMPYEMA. The term empyema is generally applied to a collection of pus in a pleural cavity, that is, in the space between the lung and the chest wall. This may happen with or following pneumonia, or from tuberculous infection, or in connexion with a specific fever, especially scarlet fever. Amongst other causes are a wound of the chest wall or the extension into the chest of a suppurating process in the abdomen, for example, from a liver or kidney abscess.

There is first a pleurisy with effusion, or wet pleurisy, and the effused fluid becomes loaded with pus cells. When it occurs with scarlet fever an empyema may not at first cause symptoms pointing to the chest, but the patient does not recover properly from the fever. Similarly, when it follows pneumonia, the temperature does not become normal when it might be expected to do so, though it becomes remittent or intermittent; or having become normal it recurs. Severe delirium in a child with pneumonia would be suggestive of a co-existing empyema. An empyema may cause sharp pain in the side and there may be a short, dry cough, but, in any case, whenever a doctor suspects the existence of empyema he tests his suspicion by drawing off some of the fluid for examination.



EMPYEMA: pus in the pleural cavity, the space between the lung and chest wall

To the extent to which it occupies the pleural cavity an empyema compresses the lung, and, if this persists for some time the pleura covering the lung becomes thickened and contracted so that even when the fluid is withdrawn the lung is unable to expand. Inflammatory processes also invade the lung itself, which becomes firm and contracted from the formation of scar tissue, while dilatations form on the bronchial tubes, a condition known as bronchiectasis.



EMPYEMA: By expansion of sound lung and consequent displacement of heart, cavity resulting from empyema is obliterated

It is therefore desirable to evacuate an empyema as soon as possible after its discovery. This is done by making an opening in the chest wall at the side, a portion of a rib usually being taken away, and inserting a drainage tube. The patient is, thereafter, encouraged to breathe freely in order to promote expansion of the lung. Should this not be complete, a cavity will remain which will continue to suppurate unless the chest wall falls in and closes it. *See* Bronchiectasis; Consumption; Lung; Pleurisy; Pneumonia.

EMULSION. In the ordinary way an oil or a resin will not mix with water properly, but if a little gum acacia or gum tragacanth be added, and the substances rubbed up together in a mortar, a good mixture is got in the form of a milky-looking liquid. This is called an emulsion, and in it the fat or oil is present in very small droplets, which are prevented from running together by the coating of gum which each has received. Milk and yolk of egg are natural emulsions, and gum-resins, such as ammoniacum or asafoetida, form natural emulsions, a substance of this kind only requiring to be rubbed up with water. Other agents frequently used are alkalies, usually a solution of potash; soap; tincture of quillaia and tincture of senega. *See* Cod-liver Oil; Quillaia.

ENCEPHALITIS. Inflammation of the brain, or encephalitis, chiefly affects the grey matter, and may occur from extension of sepsis from a wound on the head or a suppurating middle ear, from the attack of microbes circulating in the blood, or from alcoholic or other poisoning. It frequently accompanies meningitis, but may occur independently, though sometimes it is difficult to distinguish it even then from meningitis. It may be associated with one of the infectious diseases, for example, measles, scarlet fever, whooping-cough or influenza.

The onset of encephalitis may cause irritability, drowsiness and perhaps vomiting, ensuing upon which there is progressive clouding of the faculties, perhaps passing into deep unconsciousness, or coma; sometimes there are convulsions. The temperature may be high. Consciousness may not be regained, but, on the other hand, after the lapse of some days or weeks, there may be decline of the fever and awakening to consciousness, though mental dullness and paralytic symptoms may persist for some time.

Acute polio-encephalitis, so called because the grey matter is the site of the disease, is infectious, and presumably due to the virus which causes acute polio-myelitis, or infantile paralysis. It affects young people especially.

ENCEPHALITIS LETHARGICA. This form of encephalitis is popularly known as sleepy sickness because a striking feature of many cases has been drowsiness, from which, however, the patient could be aroused to give intelligent answers to questions. There are, however, frequent instances of the disease without drowsiness, and, indeed, the patient may be restless and sleepless. There is more or less fever and perhaps vomiting. Squint and double vision from paralysis of eye muscles is common, and a notable symptom which is sometimes present is persistent hiccough.

The patient may become profoundly unconscious and may die. If he recovers it may be completely; on the other hand, there may be serious sequelae. Some patients are left with symptoms resembling those of paralysis agitans, or Parkinson's disease (q.v.) ; others those of St. Vitus's dance (q.v.) ; others suffer from severe ataxia, their movements resembling those of a drunken person. Still others exhibit mental and moral defects ; they are unclean, lying or thievish in their habits, and so on. Sometimes there is a constant free flow of saliva which is very disagreeable.

It should always be remembered that this disease may occur in slight degree, so slight indeed that it may be overlooked altogether, and nevertheless be followed by one or more of these sequelae. Whatever the cause or the extent of encephalitis, its treatment must include rest in bed in a quiet room. Neglect of rest, even in very mild cases of encephalitis lethargica, may have very serious consequences, and during epidemics of the disease apparently trifling indisposition of a vague character should be reported to a doctor.

The diet should be light, and the bowels must be kept freely open. Headache may be relieved by cold applications to the head. Further treatment depends on the precise cause at work. A septic wound or suppurating middle ear, or a brain abscess, will necessitate an operation.

Acute polio-encephalitis and encephalitis lethargica are notifiable diseases. *See* Brain ; Fever ; Infantile Paralysis ; Meningitis ; Paralysis.

ENDARTERITIS. Inflammation of the internal coat of an artery is described as endarteritis. Acute inflammation, which, however, probably involves all the coats of the artery, may occur from sepsis and, rarely, from other causes, its interest and importance mostly merging in the septic condition of which it is a part. Chronic endarteritis may occur in several forms, but in all there is a thickening of the internal coat caused by the growth of new cells. When widespread this constitutes the condition known as arterio-sclerosis (q.v.). A patchy endarteritis, or atheroma, usually affects the aorta or some other large artery. The thickened patches project into the lumen of the vessel as flattened nodules. Arterio-sclerosis and atheroma, generally speaking, are diseases of middle or later life.

In one form of endarteritis the disease tends to block or occlude the vessel, and hence is called the obliterative or plastic type. This may occur in arteries in the neighbourhood of chronic ulcers, and then has the salutary effect of lessening the risk of bleeding. Syphilis is a common cause, and tuberculosis.

It sometimes occurs in the arteries of the lower limbs, causing the disorder known as intermittent claudication, in which, after walking for a short distance, the patient is pulled up by an acute burning pain in the limb. This passes off after resting for a short time, but recurs after another short walk. In course of time there is likely to be gangrene of the toes, the foot or even a larger portion of the limb. Syphilis or the abuse of tobacco appears to be the usual cause, and treatment should be directed appropriately. *See* Arterio-sclerosis; Artery.

ENDEMIC. A disease is said to be endemic in any place where instances of it are always occurring. When circumstances become favourable the disease is apt to assume an epidemic form and spread. Solitary cases of an infectious disease are said to be sporadic. *See* Epidemic.

ENDOCARDITIS. Inflammation of the lining of the heart is known as endocarditis. The valves are mainly affected and almost always those of the left side. Along the lines where the flaps come into contact during the closure of the valve fibrinous deposits take place, which may prevent the valve from closing or obstruct its orifice. When the inflammation abates the deposits are invaded by tissue cells and absorbed, but the parts on which they have rested are changed into scar tissue, more or less, and by subsequent contraction of this the valve may become either incompetent or stenosed, or both. The most common cause of this type of endocarditis is acute rheumatism in one of its forms, or St. Vitus's dance, but it may occur in connexion with one of the infectious fevers.

Following on infected wounds, pneumonia and other conditions in which the blood stream may be invaded by swarms of bacteria, acute endocarditis of the ulcerative, or malignant, type may develop. The vegetations on the valves are not confined to the lines of contact of the flaps, and ulceration occurs. From the heart, emboli, containing bacteria, are distributed all over the body. There is high fever and prostration. Bleeding may take place from the nose, the bowel, into the skin and elsewhere. The temperature may tend to go up and down irregularly, and there may be profuse sweating. Abscesses may form in many parts of the body. The disease is very fatal, death usually occurring in from a few days to three or four weeks.

There is a type known as sub-acute bacterial endocarditis which usually occurs in hearts damaged by previous disease. There is progressive anaemia with pallor, or the skin may assume a café-au-lait tint, or a dark brown one. Scattered here and there, small bluish spots, or petechiae, may mark the sites of minute haemorrhages, and tender pink nodules may form on the pads of the fingers and toes. Fever is irregular. The fingers become clubbed or swollen at their extremities. Minute bleedings occur in the retina of the eye, and embolism there may cause sudden blindness. The duration of the disease may be anything from about three months to two years.

The recognition and treatment of endocarditis can only be undertaken by a doctor. It may be said, however, that in the acute rheumatic type salicylate of soda is given, and in the infective variety injections of sodium cacodylate, an organic preparation of arsenic, may do good. A person whose heart has been damaged should live carefully and should get rid of sepsis about his teeth or anywhere else. *See* Heart; Rheumatism

ENDOCRINES: INTERNAL SECRETIONS

Chemical Activators of the Functions of the Body

Investigations into the endocrine system, one of the latest chapters in the history of medical science, have shown it to be of supreme importance in the bodily economy and have thrown much new light on the chemistry of the body and its influence on the bodily and mental make up of the individual. See also the articles under the headings of the various glands and diseases mentioned

The processes which are concerned in the development and functioning of the body are very complex and require some sort of control to ensure harmonious activity. Much of this control is exercised by the nervous system, but a large amount is accomplished by substances known as hormones or chemical messengers.

An important group of hormones comprise the secretions of various glands which are poured direct into the blood and not out through a duct. Such a secretion is called an internal secretion, or endocrine, and the gland a ductless or endocrine gland. Some glands which have ducts for one secretion also contain within their substance groups of cells which furnish an internal secretion.

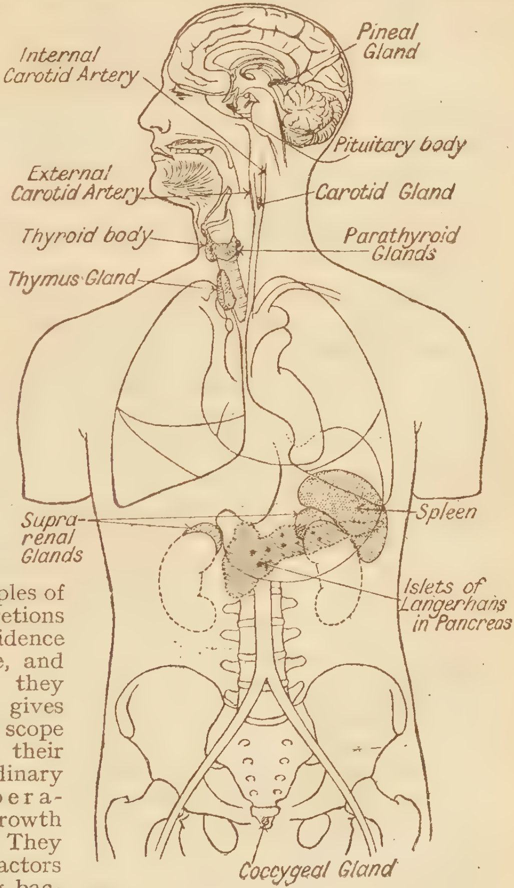
The endocrine glands include the thyroid, parathyroid, supra-renal, pituitary, the interstitial cells of the ovary and the testis, the thymus, the pineal, the islets of Langerhans in the pancreas, and scattered masses of cells here and there in the body, which resemble those of the supra-renal medulla. Some even of the ductless glands furnish more than one secretion. Thus, the pituitary has two lobes with different functions.

The fact that a gland has no duct raises the presumption that it has an internal secretion, but it must also be shown that its extract contains a definite chemical substance and that it has a physiological action of some kind when injected into the body. Evidence is also furnished by disease.

It has been shown that disorders with well-defined features depend upon changes in particular endocrine glands, changes resulting either in a deficiency or an excess of the internal secretion. Thus, cretinism and myxoedema are caused by deficient thyroid secretion, while an excess of this causes exophthalmic goitre. In Addison's disease there is a deficiency of the secretion of the medulla of the supra-renal, in acromegaly an excess of that of the anterior lobe of the pituitary. Diabetes insipidus depends on some alteration of the posterior lobe of the pituitary, and diabetes mellitus on a deficiency of the secretion of the pancreatic islets. Deficiency of parathyroid secretion causes the nervous affection known as tetany. Besides such well-defined results of glandular defects, there may well be others less definite when the interference with the secretion is of lesser degree.

Extracts of endocrine glands are made and have been extensively used in laboratory experiments and in the treatment of disease. The administration of such may completely remove the symptoms, as thyroid extract may do in myxoedema, though the administration must continue throughout life; on the other hand, as when adrenalin is given for Addison's disease, although the symptoms are improved the disease persists. Treatment by such extracts is commonly referred to as organo-therapy.

The active principle of extract of suprarenal medulla is adrenalin, a substance which may now be built up artificially by a chemist; that of extract of the pancreatic islets is insulin, and this can be prepared in a crystalline form; and that of thyroid extract is thyroxin, an organic preparation of iodine. The isolation of the active principles of internal secretions clinches the evidence of their existence, and the part which they play in disease gives some idea of the scope and variety of their activities in ordinary physiological operations, such as growth and metabolism. They are important factors also in combating bacterial or other poisons in the body.


Pineal Gland
Internal Carotid Artery
Pituitary body
External Carotid Artery
Carotid Gland
Thyroid body
Parathyroid Glands
Thymus Gland
Spleen
Supra-renal Glands
Islets of Langerhans in Pancreas
Coccygeal Gland

ENDOCRINE. Sites of the principal glands

ENDOMETRITIS. Inflammation of the lining membrane of the womb is called endometritis and may occur in acute and chronic forms. When acute, the inflammation almost always occurs in the wall of the organ as well as the lining, and should chronic endometritis last for a considerable time the morbid processes connected with the disease will probably extend into the wall.

Acute endometritis is mostly due to the extension of infection up the genital passages into the womb, either when portions of after-birth or membrane remain in the cavity, after labour or abortion, or as a result of gonorrhoea. There may not be much pain in puerperal cases, though the womb is very tender. In gonorrhoeal cases pain may be very severe and, as in puerperal cases, there may be considerable fever. A free purulent discharge from the vagina makes its appearance, and if the onset is during a monthly period the menstrual flow is arrested. Immediate medical care is required. Pain may be relieved by applying an ice-bag or hot fomentations to the abdomen. In puerperal cases it is essential that the womb should be cleared of anything that may have been retained.

Chronic endometritis may follow the acute form or occur independently. It is always due to bacterial infection, but displacements of the womb, the presence of growths, excessive coitus, constipation or any other circumstance that causes congestion of the organ predisposes to such infection. A more or less profuse discharge is present, consisting of pus and mucus, and, from its appearance, described as leucorrhoea or the whites. Signs of nervous fatigue are often manifest in patients in whom the condition has lasted for some time.

In treating the condition it is necessary first of all to eliminate anything that causes congestion. Iron tonics are often useful, especially if magnesium sulphate is added. Douches assist in keeping the parts clean. It may be necessary to have the womb curetted. Injections of pure glycerin into the womb give good results in skilled hands in both the acute and chronic forms of the disease. *See* Douche ; Genital System ; Puerperium ; Womb.

ENEMA. An injection of liquid into the rectum, or lower bowel, is called an enema (plural, enemata) and may be used to clear the bowel, to dispel flatus, to introduce nourishment into the body, and for other purposes. Nutrient enemata are dealt with under the heading Rectal Feeding.

For a purgative enema 16 ounces or more of liquid should be used ; for a child of five about 5 ounces, and for an infant about 1 ounce. It may consist of plain or soapy water, or 2 to 4 tablespoonsful of castor oil or 1 or 2 tablespoonsful of oil of turpentine, or both, may be added for an adult. Instead of castor oil, 6 ounces of olive oil may be added, or when there is difficulty in moving the bowels the enema may consist of ½ to 1 pint of olive oil. A soapy enema is made by pouring 1 pint of boiling water over 1 ounce of soft soap, or an equivalent amount of hard soap shavings, and stirring till the soap dissolves. Other ingredients should be thoroughly mixed.

The addition of turpentine to an enema will help to dispel flatus, but this can also be achieved by ½ ounce of tincture of asafoetida made up to 4 ounces with starch mucilage. An enema should be at a temperature of about 98° F.

In cases of persistent diarrhoea an enema of 4 to 6 ounces of starch mucilage is sometimes used, often with the addition of laudanum, and starch mucilage is also a useful medium for introducing other drugs into the bowel.

Different kinds of apparatus are used for giving an enema; usually it is a Higginson's syringe. For the larger enemata an ordinary douche can or bag of at least 1 pint capacity, will also serve. For children a rubber ball syringe is often used, and this would also serve for an adult receiving a small nutrient, or a starch enema, though it is more usual to employ for such purposes a funnel with a length of rubber tubing attched. A glycerin enema, consisting of 1 or 2 teaspoonsful of this substance, is given with a small syringe which has a long nozzle.

For receiving an enema the patient is placed on the side, preferably the left, with the thighs bent up on the abdomen. The bed or couch should be protected with a waterproof sheet. All air should be expelled from the tubing before introducing the nozzle, which, having been smeared with soft paraffin, is then pushed into the bowel in an upward and forward direction for a distance of an inch or rather more. Should the liquid not run freely the position of the nozzle should be moved a little. A douche can or funnel should not be more than 1½ to 2 feet above the level of the patient's body in order to lessen the force of the flow. To prevent the immediate return of the liquid the injection should be given slowly. When the enema is to be retained and the patient has difficulty in holding it, it will be helpful if a folded napkin is held against the lower end of the bowel. *See* Constipation; Douche; Syringe.

ENTERIC FEVER. *See* Typhoid Fever.

ENTERITIS. Inflammation of the bowel, or enteritis, may be due to many causes, and commonly pain and diarrhoea are amongst its symptoms. When the stomach is also affected one speaks of gastro-enteritis. Inflammation of the large bowel is described as colitis (q.v.). *See* Diarrhoea; Intestine.

ENZYME. *See* Ferment.

EPIDEMIC. When a disease assails a number of persons simultaneously or in rapid succession it is said to be epidemic, and when world-wide, as was the outbreak of influenza in 1918, pandemic.

Usually the disease is one due to some micro-organism. The pollution of drinking water with the excreta of some person carrying the infection may cause a widespread epidemic of typhoid fever, cholera or some other water-borne disease throughout the community that uses the water, and each patient may serve as a fresh focus of infection. The provision of a safe water supply prevents such epidemics, however, and, even when the water supply cannot be depended on, inoculation against the diseases goes a long way towards preventing epidemics.

Some diseases show a seasonal tendency to epidemicity, and, as in dysentery and infantile summer diarrhoea, this may depend on the earth temperature reaching a certain height or, as in the common cold and influenza, on cold weather causing people to crowd together in a heated atmosphere. Weather conditions may favour an outbreak of certain diseases by increasing the prevalence of flies or other insects which act as carriers.

Some diseases show a periodicity in the recurrence of epidemics not at all, or only partially, dependent on seasons; thus, for influenza it is 33 weeks and for measles 2 years. This can be explained by each epidemic using up the available stock of susceptible persons so that for a period, varying according to the disease, the community is largely immune. The protection of the individual against influenza wears off; children are born and form a sufficient number of susceptible subjects to permit infection from a measles carrier to become effective.

Preventive vaccination and inoculation, if thoroughly carried out, would control the epidemicity of most infectious diseases. *See* Endemic,; Infectious Disease; Notification; Vaccination.

EPIDERMIS. *See* Skin.

EPIGASTRIUM. The area on the surface of the abdomen which lies in front of the stomach is called the epigastrium; often it is referred to as the pit of the stomach.

EPIGLOTTIS. Situated behind and below the root of the tongue, the epiglottis, which is made of fibro-cartilage, looks like a lid for the larynx (q.v.), and at one time was supposed to be drawn down over the entrance to the latter during the act of swallowing. Food and drink, however, are prevented from entering the larynx by this being drawn up against the epiglottis and the base of the tongue in swallowing.

EPILEPSY: THE "FALLING SICKNESS"

Conditions in which Epileptic Phenomena Appear

After a discussion of the still obscure nature of epilepsy and a classification of varieties of epilepsies according to their cause, a precise description is given here of the most common form. See Bromide; Convulsions; Fit; Heredity; Hysteria; Psycho-therapy

An old popular name for epilepsy was the falling sickness; nowadays the disease is usually referred to simply as "fits." There are instances of epilepsy, however, in which the patient neither falls nor has fits. He merely becomes pale, stares in front of him, and for the moment stops whatever he is doing; if he has anything in his hand, he drops it. Then he resumes talking or whatever he was doing; for the moment he has been quite unconscious. This is called petit mal, or minor epilepsy, and it is the seizure of unconsciousness which identifies his condition with the form of epilepsy in which fits occur—grand mal, or major epilepsy.

An epileptic fit may be preceded by some alteration in the patient's demeanour, for example, he may be very irritable or irascible or, on the other hand, peculiarly placid ; or by some sign, designated an aura, such as flashing lights, ringing in the ears, a feeling of coldness or warmth or tingling somewhere about the body, a smell, a taste, or even an idea. The aura varies for different epileptics, but for any one person it is always the same.

Commonly the fit is ushered in by a loud shout, the so-called epileptic cry, the patient immediately falling to the ground. He is very pale and is in a state of tonic spasm or rigidity, the face being turned to one side with the mouth firmly closed and the eyeballs turned upwards ; the hands are clenched and the legs stretched out. This lasts for a few seconds, and then the stage of clonic spasms begins, the face twitches, the eyes roll, and the head, body and limbs are jerked about, the hands opening and closing.

The face is dusky. Rapid champing movements are made with the lower jaw, and foam gathers at the corners of the mouth ; as the tongue is often caught between the teeth and bitten deeply the foam may be blood-stained. Frequently there is an escape of urine and faeces. This stage lasts for one or two minutes or a little longer, and then the movements gradually cease, the patient becoming limp and breathing stertorously. He is now in a state of profound unconsciousness, or coma, from which he may awake in a dazed condition, or, if allowed, he may sleep on for some time.

In some instances fits only occur at night, nocturnal epilepsy, and the patient and his friends may remain ignorant of his disease, bed-wetting, which is a likely accompaniment of the fits, being ascribed to other causes.

In what is called status epilepticus one fit rapidly succeeds another, perhaps for hours or even days, and this may easily have a fatal ending. Ordinarily there is a considerable interval between the fits, perhaps a fortnight or a month. There is also considerable variation in the length of time, following a fit, during which an epileptic is incapacitated from his ordinary duties. Sometimes serious and constant symptoms of mental derangement manifest themselves, and this may lead to progressive mental decline, or dementia (q.v.).

True epilepsy mostly begins in early life, infantile convulsions sometimes being of this nature ; it affects boys and girls equally, though later on males predominate.

Fits which are indistinguishable from those of epilepsy occur in a large variety of disorders, as, for example, hysteria, anaemia, diabetes, general paralysis of the insane, dementia praecox, and so on. There is a form of the disease, known as Jacksonian epilepsy, which is caused by local irritation of the brain by depressed bone, inflammatory swelling or a scar, following an injury to the head.

Many epileptics inherit their disease. The incidence of epilepsy would be much diminished if epileptics refrained from marrying and having children; every child of an epileptic need not have the taint, but in a family some members are almost sure to have it.

When a child is subject to fits, an examination should be made for possible sources of irritation, and such should be remedied. An operation on the cause of irritation may cure Jacksonian epilepsy, but if the fits are very general it is unlikely that they will be cured even by removal of a possible irritant.

The object in view in the medicinal treatment of epilepsy is to prevent the occurrence of fits for a long period—two years at least—and so attempt to eliminate the element of habit. The drugs most generally used are the bromides, especially the potassium salt; but, as this may be generally depressing when used constantly for a long time, it is often combined with the sodium and ammonium salts, or the sodium salt is given in preference, from 30 to 90 grains of this or of the mixed salts being given daily. This amount is given in three doses, and it may be arranged that the last dose is twice as strong as the others, more especially for nocturnal epilepsy. Each dose is freely diluted with water. This lessens the risk of the drugs irritating the stomach or causing a bromide rash on the skin, particularly if about 10 grains of sodium bicarbonate are given with the dose. If, nevertheless, a rash tends to occur, short courses of arsenic should be taken.

Amongst other drugs given for the disease are borax along with bromides, belladonna and luminal. The instructions of the doctor as regards dosage should be faithfully carried out, though untoward symptoms should be brought to his notice at once. A sudden interruption of the medicine is very undesirable.

The diet should be simple, condiments and highly seasoned dishes being objectionable, and meat should be taken in strictly moderate amount. No alcohol should be taken, and tea and coffee only sparingly, if at all. No late meals should be indulged in. The bowels should be kept active. Exercise in the open air is desirable. When fits are numerous and difficult to control, the best treatment is that received in an epileptic colony.

The treatment of a fit follows very much the same lines, whatever its cause. The patient is placed on his back, and although the movements should be restrained sufficiently to prevent him from hurting himself, no attempt should be made to suppress them by force. A piece of wood, the handle of a spoon or anything similar, should be wrapped in a fold of a handkerchief and pushed between the back teeth, to act as a gag and prevent the tongue from being bitten. Tight clothing about the neck and chest should be loosened. If the patient vomits, he should be turned on his side. As he is recovering he should be spoken to reassuringly, the possibility of his being in a somnambulic state and, in such condition, capable of sudden, violent action being borne in mind.

EPIPHYSIS. A long bone, that is, one possessing a shaft and two articular ends, is at the outset a bar of cartilage or gristle, and becomes bone by centres of ossification appearing and extending until the process is complete. Such occur not only in the shaft, or diaphysis, but at the ends, and a stage arrives when both the shaft and the ends are bone, but the latter are separated from the shaft by a plate of cartilage. Each end is then spoken of as an epiphysis, and the plate of cartilage as the epiphyseal line. The persistence of these plates makes it possible for the bone to grow in length, and by about the twenty-fifth year all have been replaced by bone and no further growth is possible. Epiphyses are not confined to long bones, however, but occur in any bone which develops from cartilage.

So long as the epiphyseal cartilage exists, it represents a vulnerable part of the bone as, by the exercise of sufficient force, the epiphysis may be dragged or knocked off the shaft. Such an accident may occur from pulling on the limbs of young children, as by lifting up a child by the wrists.

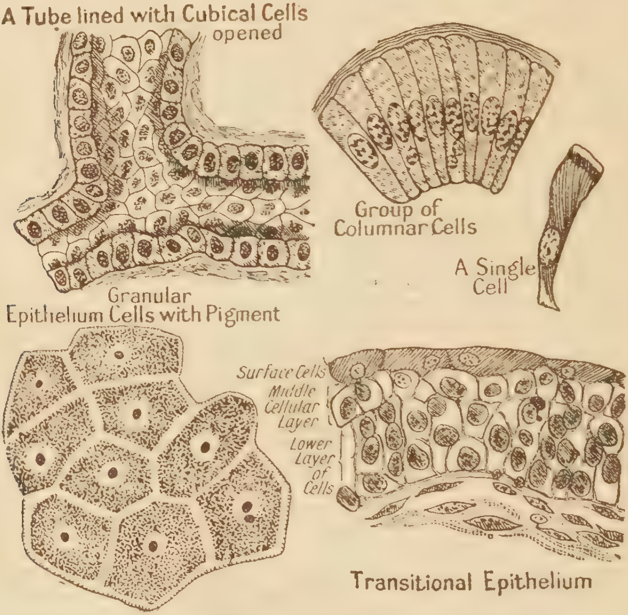
Inflammation of the epiphyseal cartilage, or epiphysitis, may be acute or chronic. The acute disease is due to the invasion of the cartilage by one of the micro-organisms which cause suppuration. It has a superficial resemblance to acute rheumatism in the neighbouring joint, but the pain and tenderness are outside the joint, and the patient looks more ill than would be expected in the other disorder. Surgical care is extremely urgent. Chronic epiphysitis is generally due to tuberculosis, though sometimes it is syphilitic in origin. Tuberculosis of a joint in children begins usually as an epiphysitis. *See* Bone ; Cartilage ; Joint.

EPISTAXIS. The technical name for bleeding from the nose is epistaxis. *See* Bleeding.

EPITHELIUM. The tissue which covers the surface of the body and lines its cavities is called epithelium. The cells of which it is composed are crowded together with very little cement substance to separate them. If they form a single layer, the epithelium is said to be simple, or, if several layers, compound or stratified, except that one generally uses the term transitional when, as in the bladder lining, there are no more than three or four layers.

The cells exhibit various shapes. Those lining the peritoneum and other cavities within the body consist of flat, thin plates joined to each other at the edges so as to produce a tesselated appearance. Such are described as pavement cells, and pavement epithelium is also spoken of as endothelium when found in the blood vessels, lymphatics, serous and other cavities.

Again, the cells may be cubicle or columnar in shape. Cubical cells are often found lining the ducts of glands, and columnar cells form the usual covering of a mucous membrane which lines the alimentary, respiratory and other passages. In the air passages, the Fallopian tubes and elsewhere, the free border of the columnar cells is prolonged into a number of hair-like processes, or cilia (*see* Cell). These carry out a lashing movement by which particles are carried along the surface of the membrane. In this way sputum is brought up from the air passages, for example, and with it particles of inhaled dust.


A Tube lined with Cubical Cells opened
Group of Columnar Cells
A Single Cell
Granular Epithelium Cells with Pigment
Surface Cells
Middle Cellular Layer
Lower Layer of Cells
Transitional Epithelium

EPITHELIUM. Various types of cells which make up epithelial tissue

Sometimes epithelial cells are spheroidal or polyhedral in shape. These are found in the deeper layers of stratified epithelium, such as the epidermis or scarf skin, and in many glands. The hairs, nails and enamel of the teeth consist of modified epithelial cells. *See* Cell ; Tissue.

EPSOM SALT. Because it was originally obtained from the mineral waters of Epsom, magnesium sulphate is commonly known as Epsom salt. It occurs as small, colourless crystals, and has a bitter taste. It is freely soluble in water. It acts as a saline cathartic, and is given in doses of 120 to 240 grains, or, if given in repeated doses, 30 to 90 grains. There is also an effervescent form, and this is given in doses of 240 to 480 grains.

Magnesium sulphate is contained in the compound senna mixture, or black draught, and in the so-called white mixture, and may be taken in these forms.

Magnesium sulphate acts as an antidote in poisoning by lead or carbolic acid. A lotion made by dissolving 1 ounce in 10 ounces of water, if dabbed on the skin and allowed to dry, is a protection against mosquito bites. *See* Cathartic ; Magnesium.

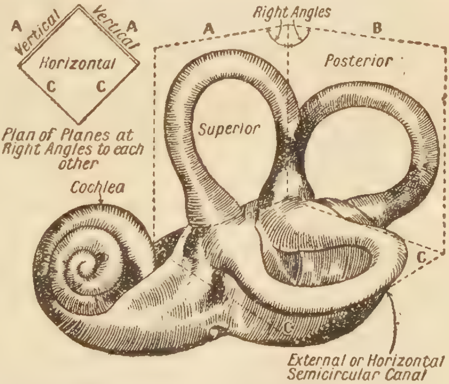
EPULIS. The name epulis is given to two tumours found on the gums, though they differ in nature. The simple epulis is composed of fibrous tissue. It only occurs when there is septic mischief, such as pyorrhoea, in a tooth socket, and grows from the periosteum covering the jaw-bone or from the socket. It forms a rounded, red swelling which later may ulcerate.

The malignant epulis is a myeloid sarcoma, that is, one containing a large number of giant cells. Compared with other sarcomata, it has a low degree of malignancy. At first it forms a smooth mass of a purple colour, but soon ulcerates and acquires a fungous appearance.

Removal by operation is the treatment in either case. *See* Gum ; Mouth ; Pyorrhoea ; Tumour.

EQUILIBRIUM. The sense of balance or equilibrium is controlled by the lesser brain, or cerebellum, to which centre messages are carried from the semi-circular canals in the inner ear, from the eye, from muscles and joints, and from the skin. In accordance with such messages, impulses pass out from the cerebellum to the muscles concerned in maintaining posture.

The semi-circular canals are tiny tubes placed behind the vestibule or middle portion of the inner ear, one being vertical and from before backwards, another vertical but from side to side, and the third horizontal. Each is filled with fluid, and this is set in motion by movements of the head only or of the whole body in the direction in which the tube is placed.


A
Vertical
Vertical
A
Horizontal
C
C
Plan of Planes at Right Angles to each other
Right Angles
A
B
Posterior
Superior
Cochlea
C
C
External or Horizontal Semicircular Canal

EQUILIBRIUM. Rôle of the semi-circular canals of the internal ear in the maintenance of balance

At one end of each canal there is an expansion, or ampulla, containing a viscid mass, the cupula, in which are embedded crystals of calcium carbonate or otoliths. Into this mass hairs project, and the movements of the otoliths, occasioned by movements in the canal fluid, excite impulses in the terminals of the vestibular nerve, which pass on into the brain.

When the head or body is rapidly rotated and then brought to a standstill, the continuance of the effect of rotation on the canal fluid may cause so much giddiness that the person is not able to keep erect; also, pressure on the eardrum, as in syringing, may be communicated to the canals and cause giddiness. Serious giddiness occurs in Ménière's disease, which is caused by bleeding into the canals or some other disturbance of the circulation in the canals. *See* Ataxia; Dizziness; Ear; Gait.

ERGOT. The spawn of a fungus found growing on rye, ergot causes contraction of the smooth muscle fibres in blood vessels, the uterus, the bladder, and elsewhere in the body. It thus may control bleeding, correct menstrual disorders, or stimulate a sluggish bladder. It is generally given as a routine measure at the end of labour to procure firm contraction of the uterus, the expulsion of clots, and to lessen the risk of undue bleeding. There are several preparations, including the dried extract, which is given in pills or tablets, in doses of 2 to 8 grains; the liquid extract, dose 10 to 30 minims; and the ammoniated tincture, dose ½ to 1 drachm.

POISONING BY ERGOT. From the continuous use of rye bread containing the fungus, chronic poisoning, known as ergotism, may occur. There may be itching and tingling of the skin, followed by numbness or actual anaesthesia of the hands and feet, and parts of the fingers and toes may become gangrenous, or die. Sickness and diarrhoea may be troublesome symptoms.

An overdose of the drug may cause acute poisoning, characterized by sickness, purging, headache, dizziness, convulsions, loss of consciousness, and perhaps death. An emetic should be given, and thereafter a dose of castor oil and copious draughts of strong tea. The patient should be kept warm.

ERUPTION. *See* Rash; Skin.

ERYSIPELAS. An acute infectious disease sometimes referred to as St. Anthony's Fire and "the rose," erysipelas is caused by a streptococcus which invades the lymphatic vessels just beneath the scarf skin and causes inflammation. There results a bright red patch which spreads, the spreading edge not fading into the normal skin like many inflammatory blushes, but being raised and well defined; usually blisters appear on the patch, the fluid in which is clear at first, but soon becomes turbid. The affected part feels hot and stiff, but rarely actually painful unless it is the scalp. From the absorption of poisons from the erysipelatous skin there is fever, sometimes reaching 104° F. and over, and generally delirium also. The expansion of the patch may cease after about five days, and the temperature fall; but, on the other hand, the disease may be prolonged up to three weeks. Protraction of the disease causes great prostration; the tongue becomes dry, cracked and brown, and low muttering delirium sets in.

Erysipelas begins most commonly on the face, infection being admitted probably through some little crack about the edge of the mouth or nostril, but it may spread to other parts of the body. In other instances infection begins at some wound or ulcer. In numbers of cases there is a tendency to recurrence on the face particularly, and in time there is considerable thickening of the skin and more or less deformity. Erysipelas is a notifiable disease. A person with an open wound, or a woman who has just been confined, runs a great risk of contracting the disease if brought into contact with it directly or indirectly. Elderly people and alcoholics are liable to succumb to it.

In the general treatment of the disease anti-streptococcic serum and intramuscular injections of colloidal manganese have been successfully used. The tincture of perchloride of iron, in doses of 20 to 30 minims, is an old remedy. The diet should be easily digested but liberal. Alcoholic and other stimulants, such as strychnine, may be ordered by the doctor.

For the local treatment ichthyol is a favourite remedy. It may be used in watery solution or as an ointment, from 20 per cent upwards. Sometimes the patch may be prevented from spreading by painting the sound skin, some distance in front of the edge, with a strong solution of silver nitrate or with tincture of iodine. *See* Dermatitis; Eczema; Erythema; Skin.

ERYTHEMA. Redness of the skin, due to flushing of the blood vessels, may be described as erythema, a Greek word meaning redness or a blush, and indeed blushing is a good example of a transitory erythema.

The cause of erythema may be something external, such as sunlight, artificial sunlight, X-rays, heat, cold, friction or chemical irritants, the redness occurring on the part exposed to irritation. Erythema due to opposing surfaces of the body rubbing on one another is called intertrigo and may occur in the groin of a fat person, below the breast in women and in other situations. Erythema on the buttocks in infants, the so-called napkin rash, may be due to the napkins not being changed sufficiently often or to their being washed with a strong alkaline soap which is not rinsed out of them. A chilblain is an example of erythema caused by cold.

Erythema from the action of internal poisons may be a symptom of scarlet fever or some other infectious disease. It may be caused also by drugs or poisons which have been swallowed and by poisons generated in the bowel or elsewhere in the patient's body. In this group there are, however, several more or less definitely defined skin affections which deserve more particular mention.

Erythema multiforme is characterised by patches of redness, having different shapes, particularly on the back of the hands and arms, and the extensor surfaces of the feet and legs. Sometimes there are blisters on these patches. The disease most often affects young people, especially females, and may persist for several weeks. Apart from slight burning the patches cause no discomfort and there is no subsequent peeling. At the beginning there may be considerable fever. Sometimes there is sore throat and pains in the joints. The treatment consists of rest in bed on a light diet, sodium salicylate or aspirin and a soothing dusting powder or lotion containing zinc oxide.

In erythema nodosum, which may occur as part of the multiform variety or independently, there are round or oval nodular patches, most often on the skin below the knees but perhaps also on the arms below the elbows. The patches are acutely tender. After persisting for some time they show discoloration similar to that which follows a bruise. The treatment includes salicylates and soothing applications to the patches.

There is another skin condition, erythema induratum, or Bazin's disease, which somewhat resembles erythema nodosum as the same parts are affected, though the most usual site for the patches is on the calves. The patches are, however, very indolent and show a tendency to suppurate. They represent a form of tuberculosis and are treated accordingly.

Erythema scarlatiniforme is a disorder in which the rash bears a strong resemblance to that of scarlatina, or scarlet fever, and the greater part of the surface of the body may be covered. Should the face be affected there is not, however, the zone of pallor round the mouth which one finds in scarlet fever, nor is there the strawberry tongue.

Lupus erythematosus, despite its name, has no relationship to ordinary lupus, which is a tuberculous disease. It affects youngish people usually, and mostly females. The erythema begins on one or both cheeks as a rounded patch which spreads at its margins, and, as there may come to be a large patch on each cheek connected across the bridge of the nose, the appearance is sometimes designated the butterfly eruption. Often there is a patch on the ear or the scalp. The patches become scaly. As the disease spreads healing takes place in the central portions, the healed area consisting of scar tissue. Though it may occur in an acute form the disease is usually protracted. Salicylates and ichthyol are among the drugs given internally. The external treatment includes plasters of salicylic acid and application of light and electricity. *See* Chafing; Dermatitis; Eczema; Intertrigo.

ETHER. A colourless volatile liquid with a strong odour, ether is used in medicine as an anaesthetic, a stimulant and a carminative. For producing general anaesthesia purified ether is employed, either with a special apparatus, such as a Clover's inhaler, or by dropping the drug on a piece of fabric placed over the mouth and nose. Generally speaking, it is a safer anaesthetic than chloroform. Sprayed on the skin, it chills the surface by its rapid evaporation, and so acts as a local anaesthetic. Ether is highly inflammable, and no naked light should be brought near it.

Ether may be used as a stimulant in fainting, collapse or cardiac weakness. The dose is 45 to 60 minims, or if repeated, 15 to 30 minims, in water. It may relieve flatulence and asthmatic symptoms. Spirit of ether and the compound spirit of ether, either of which may be referred to as Hoffmann's anodyne, although the second was originally meant, are given in doses of 60 to 90 minims, or if to be repeated, 20 to 40 minims, and for the same purposes.

Ether is used as a solvent in collodion and in ethereal tinctures. It is a solvent of fat, and is sometimes used to cleanse a greasy skin, either in a lotion or as ether soap, for which purpose, however, methylated ether may be used.

The spirit of nitrous ether, better known as sweet spirit of nitre, increases perspiration and the action of the kidneys, and is usually included in fever mixtures. The dose is 15 to 60 minims; for a child of one year, 8 minims. It is often successful in relieving infantile colic, and is given in a little water.

ETHMOID BONE. The ethmoid bone is situated in the fore part of the base of the skull, between the orbits and in the roof of the nose. It consists of a horizontal plate, to which are attached two lateral masses, and a vertical portion projecting upwards and downwards from the middle of the horizontal plate; the upper part gives attachment to the forward end of the falx cerebri, the sickle-shaped membranous structure which separates the two hemispheres of the large brain, while the lower takes part in forming the septum which divides the interior of the nose into right and left cavities. *See* Nose.

ETHYL ALCOHOL. The spirit contained in wines and spirits and used in medicine is known as ethyl alcohol. Wood spirit, or methyl alcohol, is more poisonous, though a purified form has occasionally been used in medicine. *See* Alcohol.

ETHYL CHLORIDE. A colourless and very volatile liquid, ethyl chloride is much used as a general anaesthetic for short operations, such as tooth extraction. It is the drug most often used as a spray to produce local anaesthesia.

ETHYL NITRITE. The solution of ethyl nitrite is a colourless liquid with actions similar to those of amyl nitrite (q.v.). It is given in doses of 15 to 20 minims, and the dose should be added to two tablespoonsful of water just before use. It is used in the preparation of sweet spirits of nitre. It should not be handled near a naked light as it is highly inflammable.

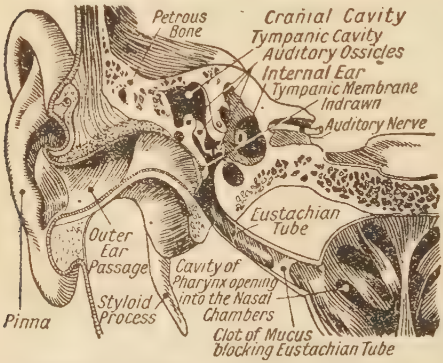
EUCAINE. A synthetic compound, eucaine, or benzamine, is a substance resembling cocaine, but less poisonous, and may be used instead of the latter as a local anaesthetic for eye injuries or operations, tooth extraction, etc. It can also be used in an ointment for the relief of intolerable itching.

EUCALYPTUS. A distillate of the fresh leaves of species of the Australian blue gum, eucalyptus oil acts as an antiseptic, disinfectant and deodorant. It is given inwardly in doses of ½ to 3 minims for fermentative dyspepsia, intestinal parasites and other affections of the alimentary tract, and as it is excreted in the breath it is useful also in infections of the air passages and when the sputum is foul. The dose may be dropped on a piece of lump sugar.

Affections of the air passages, as in a common cold or influenza, may be treated with the oil by using it in a spray or in a steam inhalation, or by dropping it on some such apparatus as Burney Yeo's inhaler, but here it is better rather to use eucalyptol, which is obtained from the oil. Ten drops of the oil shaken up with a half-glass of water provide an efficient mouth wash and gargle. Eucalyptus ointment is a good application for burns and abrasions and equal parts of the oil and of olive oil make a useful embrocation for rheumatism. *See* Atomiser ; Inhalation ; Spray.

EUSOL. A solution containing chlorinated lime and boracic acid is known as eusol. It is of great value in cleaning out infected wounds, and the method of slow irrigation with eusol through rubber tubes, known as Carrel's tubes, is sometimes adopted for this purpose. The disinfecting action of eusol is brought about by the chlorine which it liberates. Dakin's solution is a similar preparation.

EUSTACHIAN TUBE. Just behind the posterior opening of each cavity of the nose there is the opening of the Eustachian, or auditory tube, which connects the cavity behind the nose, the naso-pharynx, with the middle ear. This tube, about 2 inches long, passes upwards and outwards from the naso-pharynx, and its lowest part is funnel-shaped. If the cheeks are blown out while the mouth is tightly closed there is a sensation of pressure on the ear drums. This is due to air being forced from the naso-pharynx up into the middle ear. The same thing happens when one swallows. The main function of the Eustachian tube, in fact, is to regulate the amount of air in the middle ear. If this is excessive, it presses the drum outwards, and if deficient, on the other hand, the drum is pressed inwards by the air in the external passage of the ear ; in either event, hearing is impaired.


Petrous Bone
Cranial Cavity
Tympanic Cavity
Auditory Ossicles
Internal Ear
Tympanic Membrane Indrawn
Auditory Nerve
Eustachian Tube
Outer Ear Passage
Cavity of Pharynx opening into the Nasal Chambers
Styloid Process
Pinna
Clot of Mucus blocking Eustachian Tube

EUSTACHIAN TUBE. Tube obstructed by mucus, with consequent retraction of the ear drum

Deafness often accompanies a common cold, and this is caused by the extension of the nasal catarrh to the Eustachian tubes, causing their lining to swell and block the passage of air through them. The air present in the middle ear is already diminished by some of it being absorbed, and the lessened pressure in the middle ear leads to the drum being pushed in. With the disappearance of the catarrh in the tubes, when the cold gets better, the hearing is restored.

Chronic catarrhal conditions at the back of the nose, due to adenoids or other disorders, are dangerous because they may be accompanied by chronic catarrh in the tubes, extending perhaps to the middle ear itself when permanent impairment of hearing may result. If there is sepsis at the back of the nose, in connexion with acute or chronic trouble there, it may spread up the tubes and cause suppuration in the middle ear.

In view of the risk of introducing septic matter into the ear, it is undesirable to inflate the tubes when this can be avoided. The ordinary method of blowing the nose, that is, by compressing both nostrils and suddenly letting go, is therefore wrong, because it inflates the tubes. The proper method of blowing the nose is to compress each nostril in turn and blow down into the handkerchief through the other.

When deafness is due to narrowing of the Eustachian tube, an effort is made to relieve it by blowing air into the middle ear. This is done by using a Politzer bag, a rubber ball with a nozzle for putting into the nostril. The patient is asked to swallow, or blow out his cheeks, and at the same time the ball is compressed, and air is forced through the nose and up through the Eustachian tubes. *See* Deafness ; Ear.

EXERCISE. For the young exercise is essential to a complete and sturdy development of the body and its organs, and most children exhibit a natural disposition for vigorous exercise. In adolescents a want of keenness for exercise may be due to sheer indolence, and is often so where older people are concerned, but in either case it may be desirable to have an overhaul of the physical condition before insisting on exercise, certainly of a strenuous character.

The habit of taking regular exercise requires to be cultivated, like every other habit which is at odds with self-indulgence, otherwise, should a sedentary calling be adopted, very little, and probably quite insufficient, exercise will be taken throughout life. Moreover, if games are not begun in early life, it is not common for one who takes them up later on to acquire sufficient skill to make a game thoroughly enjoyable.

Lack of exercise means a relatively poor expansion of the chest, sluggishness of the digestive apparatus, flabbiness of muscles, probably including the heart, and an imperfect removal of waste products from the muscles and related tissues and of excretion by the skin. In course of time health is depreciated by these things and the desire and capacity for exercise lessened.

The benefits of exercise out of doors is enhanced by the stimulation of the skin, by the movements of fresh air and, in bathing, by contact with water, and by the action of the ultra-violet rays of light, particularly when a considerable part of the body-surface is exposed. To secure these advantages as far as possible, when exercise is taken indoors, the windows should be wide open and a minimum of clothing should be worn.

Hard exercise should not be undertaken except when in training. It is dangerous, for example, to indulge in strenuous exercise at the week-ends if the employment be sedentary and little or no exercise is taken through the week; or to go in for hard exercises, such as mountain climbing, at the beginning of the annual holiday without some preliminary training. A girl's frame needs muscular exercise for its development not less than does her brother's, and failure to recognize this has been responsible for much disabling maldevelopment in the past.

Walking is a most useful form of outdoor exercise as, by regulating the pace and distance and choosing hilly or level routes, the amount of exercise taken can be graduated. A sensible choice of clothing will enable more walking to be done; many people overweight, and so overheat, themselves. While running is excellent for younger people, long distance running and sprinting require preliminary training, and before engaging in serious athletics, there should be an examination by a doctor. Sprinting becomes dangerous as middle life is approached.

Swimming is a good exercise for those whose circulation is good. It helps in chest development mainly by tending to cause deep breathing as many other kinds of exercise do. This subject is also discussed under the heading Bathing. Football, hockey, and similar games require training. As a rule, football should not be indulged in before the age of nine or after that of thirty. Such games develop the team spirit, cultivate control of the temper and are thus invaluable. Riding develops the sense of balance and calls into play a large number of muscles.

Golf is the ideal game for the middle-aged, as it can be played as quietly as needs be; yet there is exercise for many muscles, and need for co-ordinated effort. Dancing possesses the advantage that it is done to music, rhythm and balance being brought into play. It is the more useful, according to the extent to which a close, hot atmosphere, late hours and loss of sleep are eliminated. For those who have the opportunity and taste for it, gardening may supply about as much additional exercise as they require.

Drill is useful, especially when practised in the open air, and the exercise is made more agreeable by being done with others and at the word of command; this applies also to other kinds of physical training.

Several exercises may easily be practised in the bed-room when there is no opportunity for anything more. Examples are illustrated and described in Plate 24.

Pieces of apparatus may be used to give variety and interest to exercises. Dumb-bells may be made of wood or metal, and for a young man should generally weigh from 2 to 4 pounds. Indian clubs generally weigh from 3 to 4 pounds, but may be lighter or heavier. A skipping rope furnishes a useful means of taking exercise; the rope should have weight. Gymnastics formerly meant exercises performed while naked, but now the term means exercises taken on such forms of apparatus as the vaulting-horse, the trapeze, parallel and horizontal bars, and so on. With a skilled instructor fitness can quickly be acquired in a gymnasium by a healthy person.

REMEDIAL EXERCISES. When exercises are directed towards the cure or improvement of disorders of any kind they are said to be remedial. Such are the abdominal exercises, breathing exercises, etc., discussed under these headings.

The well-known Swedish, or Ling, exercises are used for general physical training in Sweden, but in other countries mainly as remedial exercises. They are performed with the patient lying, sitting, standing, kneeling or suspended, and may consist of movements by the patient himself, or active movements; or of movements performed on him by another person, passive movements.

The Zander method consists in fixing the part to be exercised in a moving part of a machine which performs the exercise independently of the patient, and may be of use for stiffness, of the joints and other defects. Except for simple complaints remedial exercise must not only be prescribed by a doctor, but in many instances be carried out under his immediate supervision. *See* Abdominal Exercises; Bathing; Breathing Exercises; Massage; Training.

EXHAUSTION. *See* Fatigue.

EXOPHTHALMIC GOITRE. Also known as Graves' disease, and, abroad, as Basedow's disease, exophthalmic goitre is thus named because typical cases present two abnormal conditions, protrusion of the eyeballs, exophthalmos, and enlargement of the thyroid gland, or goitre.

The normal thyroid gland contains an immense number of spaces filled with colloid material secreted by cells which line the spaces. This material contains an organic compound of iodine, called thyroxin, which is liberated into the blood circulation for certain purposes, amongst which are the stimulation of general body metabolism and the destruction of poisonous substances. From a variety of causes, including chronic sepsis, and mental stress, an excessive amount of thyroid secretion, or an altered secretion, may be poured into the blood and cause poisoning, which shows itself in the symptoms of Graves' disease.

In most instances the gland is uniformly enlarged, is very freely supplied with blood vessels, and the colloid contents of the spaces are replaced by a thinner liquid; this is called primary Graves' disease. In other instances, symptoms of poisoning occur in a person who has had a simple goitre for a long time, in whom the gland is irregularly enlarged, or in whom there is no definite enlargement at all ; such are called cases of secondary Graves' disease. Most of the symptoms of the typical disease may be absent except increased rapidity of the pulse.

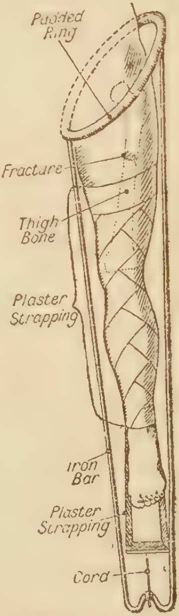
The pulse rate is very rapid, perhaps 120 to 160 per minute, and it is to be noted that Graves' disease may lead to auricular fibrillation and heart failure. There is a fine tremor of the hands and eyelids and increased excitability, and there may be disagreeable sweating. There is loss of weight, the internal combustion which goes on, even when a person is at rest, being increased in this disease. There may be mental disturbance.

Rest is an important part of the treatment of this disease, and in some cases must be absolute. A search must be made for sources of poisoning, infected tooth sockets, diseased tonsils, or nasal sinuses, or some other focus, and anything discovered must be cleaned up. The diet must be liberal, and contain a fair amount of fresh food.

Iodine is a useful drug, although some cases do not tolerate it well. Operation may consist in tying the blood vessels which supply the gland, or in removing a portion of the latter. An operation becomes an urgent matter if the poisoning is severe, if heart disease develops, if the protrusion of the eyes endangers the corneae, or if the patient must keep at work to earn a living. *See* Endocrine ; Goitre ; Heart ; Thyroid Gland.

EXPECTORATION. The ejection of phlegm from the lower air-passages by coughing or spitting is called expectoration. The process of clearing the back of the throat is described as hawking. Overmuch hawking damages the throat. The matter expectorated is called the sputum.

Spitting in public places or on floors is not only a dirty practice, but a very dangerous one. The sputum of many persons contains disease microbes and when the sputum dries the microbes are blown about in the dust and inhaled by other people. Consumption and other diseases may be contracted in this way. A spittoon, or cupsidor, unless cleansed very frequently does not make spitting any safer, as sputum dries on its margins. *See* Bronchitis ; Consumption ; Cough ; Haemoptysis ; Sputum.



EXTENSION. Apparatus for fractured thigh

EXTENSION. The straightening out of a limb or part of a limb at a joint is called extension at the joint, at the elbow or knee, for example, but carrying the arm backwards at the shoulder, or the thigh at the hip, represents extension also.

A muscle which carries out this movement is called an extensor. The opposite movement is known as flexion (q.v.).

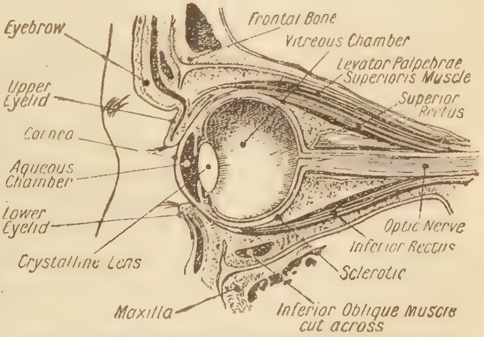
Pulling on a fractured limb in order to correct shortening and to bring the ends of the fragments into apposition is also described as extension, and resistance to the pull as counter-extension. In order to keep up the extension when the patient is in bed, strips of adhesive plaster are applied to each side of the limb, reaching as high as the site of fracture. The lower ends of the strips are attached to a wooden cross-piece, or stirrup, upon which traction is made by a weight attached to the stirrup by a cord passing over a pulley. *See* Fracture ; Splint.

EYE: THE ORGAN OF VISION

Its Marvellous Structure and Possible Derangements

The following article describes the amazingly complicated anatomical structure of the eye and the accessory mechanism of eyesight. Diseases that affect the organ are also detailed, and advice is given on the general hygiene and care of the eyes. See Accommodation ; Asthenopia ; Blepharitis ; Colour Blindness ; Conjunctivitis ; Cornea ; Cyclitis ; Glaucoma ; Keratitis ; Nyctalopia ; Nystagmus ; Optic Nerve ; Pupil ; Squint ; Stye ; Vision

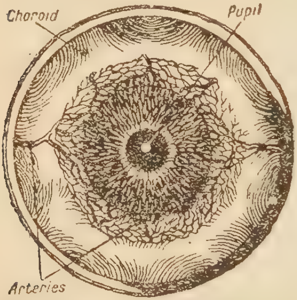
The essential parts of the visual apparatus are the eye, or eyeball, certain nerve cells in the hinder part of the large brain, and nerve fibres connecting the eye with these cells. Vibrations of the ether, which are known as light, produce images of the outside world on the sensitive membrane, or retina, at the back of the eye, thus stimulating the ends of the optic nerve, whence impulses pass back to the brain and cause the sensation of light.



EYE. Section showing principal contents of the orbit

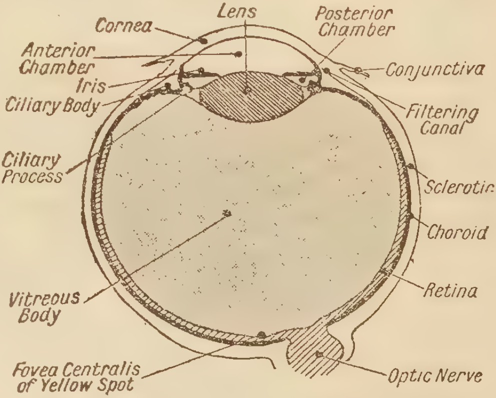
The eye is contained in a bony cavity in the front of the skull, known as the orbit, and is thus largely protected from external violence. In front of the eye are the lids, with their lashes, which can close and protect the eye, while in the outer part of the upper lid is the tear-gland, which helps to keep the surface of the eye moist.

The eye presents to view a circular clear transparent window in front, known as the cornea (q.v.), and beyond this, the white of the eye. The latter represents the sclerotic coat, a dense tough membrane, which, except for the corneal surface, covers the eyeball. This is almost spherical, but if the eye is examined from the side, it will be seen that the cornea projects from the sclerotic part, just as a concave watch glass would do were it applied to the surface of a circular orange. The cornea has no blood vessels traversing it, but is plentifully supplied with nerves and is very sensitive. Within the sclerotic coat is another, the choroid, and inside this the retina. The former has a free supply of blood vessels and many pigment cells; it extends forwards to near the junction of the cornea with the sclerotic coat, where it forms a large number of folds known as the ciliary processes, and beyond these is continuous with the outer circumference of the curtain of the eye, i.e., the iris.

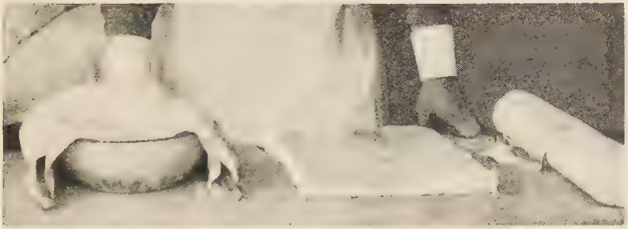

Choroid
Pupil
Arteries

EYE. By expanding and contracting, the iris regulates the admission of light to the eye

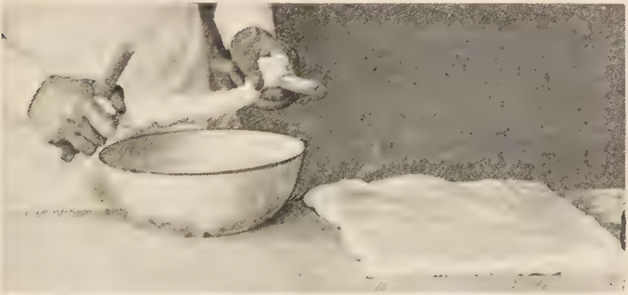
The iris may have a brown, a blue or almost a greenish tint in different people, and it is perforated by a central, circular opening, the pupil, which can vary in size. This is because the iris contains two sets of muscle fibres, some circling round it, which contract the pupil, and others radiating outwards, which dilate it. Behind the iris is the crystalline lens of the eye which resembles a magnifying glass in miniature. It is enclosed in a capsule, and supported all round its circumference by a membrane, the suspensory ligament of the lens, which, in turn, is attached to the ciliary processes. When the eye is at rest this ligament is tense, and by pulling on the capsule compresses the lens and makes its front surface flatter than the back. All round the front of the ligament, however, are muscle fibres, the ciliary muscles, which, when they contract, draw the ligament forward and relax its tension. This lessens the compression of the lens, which is an elastic body and expands, the anterior surface bulging forwards, and thereby the lens becomes more powerful in focusing. This is necessary when the eye looks at a near object, and the process is called accommodation (q.v.).


Lens
Cornea
Posterior Chamber
Anterior Chamber
Conjunctiva
Iris
Ciliary Body
Filtering Canal
Ciliary Process
Sclerotic
Choroid
Retina
Vitreous Body
Fovea Centralis of Yellow Spot
Optic Nerve

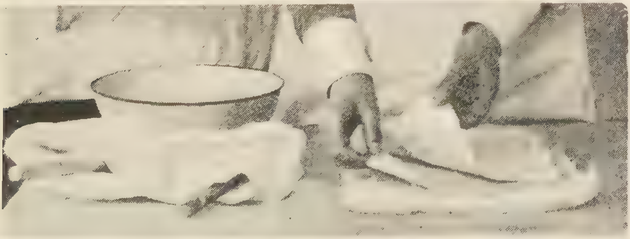
EYE. Horizontal section through the eyeball



When making a fomentation two or more thicknesses of flannel are spread between the layers of a small roller towel laid over a basin

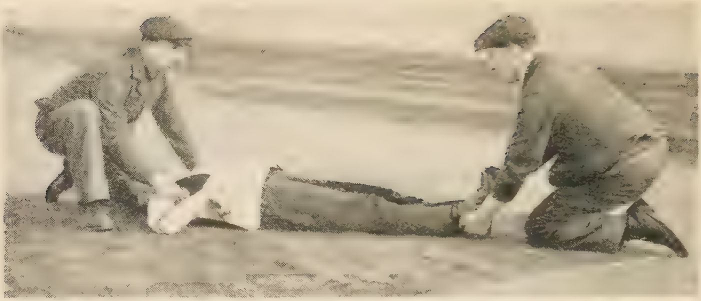


Sticks are passed through the ends of the towel, boiling water poured over it, and the sticks then twisted in opposite directions

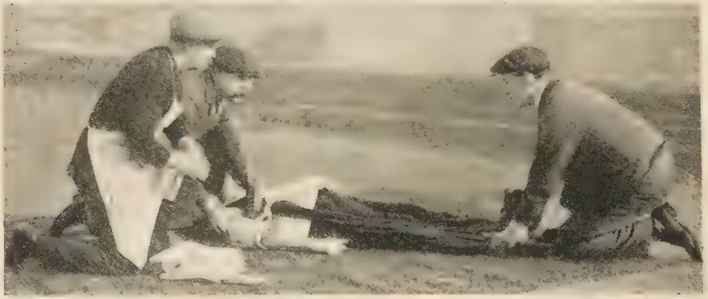


When the fomentation has been wrung nearly dry inside the towel it is shaken out and applied, covered with a slightly larger piece of mackintosh and a still larger layer of cotton wool

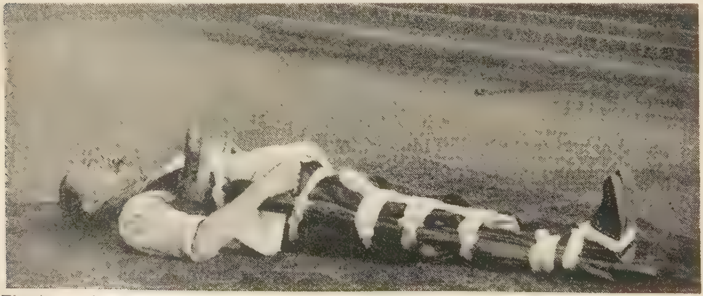
FOMENTATION : PREPARING FOR ITS APPLICATION



The injured limb is first rendered as symmetrical as possible with the sound one. This is done by one man pulling steadily upon it, holding the foot by the heel in the correct upward position. Meanwhile, another man provides counter-extension by a steady pull at the armpits



A splint can be improvised by taking a stick or a long broom, the head padded, and laying it along the outer side of the limb, with sacking or other soft material interposed. The broom is fixed to the chest by a broad-fold bandage. A second well-padded splint is placed on the inside of the limb



The two splints are fixed to the thigh by a bandage above the fracture (applied first) and another below it. Two other bandages are applied, just above the ankle. Finally the feet are tied together as shown. Tightly folded newspapers may be used as splints if wooden ones are not available

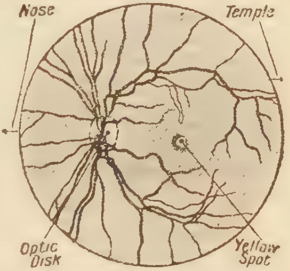
FRACTURE : FIRST-AID TREATMENT FOR A BROKEN THIGH

The lens and suspensory ligament divide the eye into a smaller front and a larger back portion. The former is further divided into what are called the anterior and posterior chambers of the eye; these are filled with aqueous, or watery, humour. The space behind the lens is occupied by a clear, transparent jelly, known as the vitreous humour.

When the interior of the eye is examined with an ophthalmoscope, the surface of the retina is spread out to the view. It has a bright red colour, and over it arteries and veins are coursing, which emerge from a small round or oval area a little to the inner or nasal side of the back of the eye. This area is known as the optic disk, and is the place where the fibres of the optic nerve, having penetrated the sclerotic coat, spread out all over the retina.

This membrane has ten layers, but it will be sufficient to note, in addition to the layer of nerve fibres, that which is known as the layer of rods and cones, and behind these a layer of pigment cells. The other layers are merely concerned with bringing the nerve fibres into relation with the rods and cones, which are the cells upon which light really acts. The names rod and cone are applied to the cells on account of their shape.

These cells are marshalled together in a layer all over the retina, except that there are none of them on the optic disk, and consequently there is no perception of light here. At the centre of the back of the eye there is a little area which, from its colour, is called the macula lutea, or yellow spot. At its centre there is a little pit or depression, the fovea centralis, which represents the part of the retina where visual perception is sharpest in ordinary illumination. It is noteworthy that lining this part, and close around it, there are only cones. On the outlying parts of the retina, however, where vision is best in a subdued light, the rods form a great majority.



EYE. Retina: the optic disk marks the entrance of the optic nerve

Sensation is supplied to the eyeball by branches of the fifth cranial nerve, which also supplies the face. Branches of the third cranial nerve supply the ciliary muscle, which, it has been noted, accommodates the eye to near vision and also the circular fibres in the iris, so that when we look at a near object the pupil contracts. The pupil also contracts when light falls on the eye. Sympathetic nerve fibres supply the muscle fibres which dilate the pupil.

The exposed surface of the eyeball, with the exception of the cornea, is covered by a delicate mantle of mucous membrane, the conjunctiva, which also covers the inner aspect of the lids, joining up with the skin at the lid margins. The surface of this membrane is kept moist by its secretions, and by that of the lachrymal, or tear, gland. Between the skin and conjunctiva covering the outer and inner sides of the eyeball respectively there are several structures, notably a plate of dense fibres, called the tarsus or tarsal cartilage, which enables the lid to retain its shape. There are also glands, the Meibomian, which lubricate the edges of the lid and the lashes. Circling round the opening of the orbit and on the lids are fibres of the orbicularis muscle which closes the lids; it is supplied by a branch of the seventh cranial nerve, and one of the signs of facial paralysis is inability to close the eye properly.

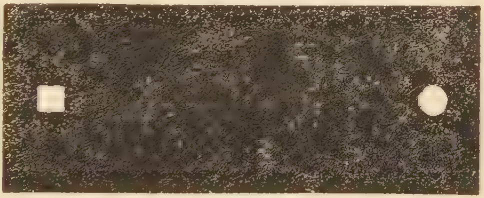
The upper lid is raised by the levator palpebrae superioris muscle, which comes forward from the back of the orbit to be inserted into the lid, and is supplied by the third cranial nerve. Movements of the eyeball are produced by six muscles. Four of these, the superior, the internal, the inferior, and the external rectus, come from the back of the orbit to be inserted into the upper, the inner, the lower, and outer parts of the globe respectively. Contraction of one of these muscles would rotate the globe towards the position of the muscle. The other muscles are the superior and inferior oblique, the former directing the gaze downwards and outwards, the latter upwards and outwards.

The external rectus is supplied by the sixth cranial nerve, also called the abducens, because this muscle rotates the eye away from the mid-line of the face; and the superior oblique by the fourth or trochlear nerve. All the other muscles are supplied by the third cranial nerve, and this is called the motor oculi, in view of the large share which it takes in producing movements of the eye.

Each optic nerve presses backwards and enters the skull through an opening at the back of the orbit. Just after doing so, the fibres which supply the inner or nasal portion of the retina cross to the other side, the band formed by these and other crossing fibres being known as the optic commissure. This lies in a shallow groove on the sphenoid bone just in front of the depression in which the pituitary gland is lodged. Should the gland become enlarged, as it does in the disease called acromegaly, it may press on the commissure, putting the fibres to the inner parts of the retina out of action, and destroying vision in the parts supplied.

From the commissure the fibres pass back in the optic tract on either side to flat projections on the base of the brain called the corpora quadrigemina, in the neighbourhood of which are nerve cells forming relay stations on the way to the back part of the brain and which also act as reflex centres for the movements of the pupil. Light, that is to say, falling on the retina, produces a nerve impulse which is carried to these cells, and an impulse comes back causing the pupil to contract. From the relay stations fibres carry visual impressions to the back parts of the occipital lobes of the brain, to nerve cells in the cortex, or superficial part of the brain substance, where the sensation of light is appreciated; from these cells, what are called association fibres link up with other cells farther forward on the brain concerned with the storage of images and the other intellectual aspects of vision.

When the eye is fixed on an object, the image of the latter is formed about the centre of the retina, and it is upside down ; it is the brain, therefore, which enables us to see things in their correct positions. If one eye is covered, besides seeing the particular object looked at, one sees more or less of its surroundings, and all that is visible is spoken of as the field of vision of the eye. Although one is not ordinarily aware of it, there is a small area which is not seen. This corresponds to the optic disk, and lies outside the object looked at. If the left eye is closed and the gaze of the right fixed on the square shown here, the page being held about 10 inches away, it will be noticed that as the page is brought near the eye, the round dot disappears, but reappears when the page is brought still nearer. It disappears because rays from it fall on the insensitive optic disk. The area on the field of vision corresponding to the disk is called the blind spot.



EYE. Diagram demonstrating the existence of a blind spot in the retina. See text for method of use

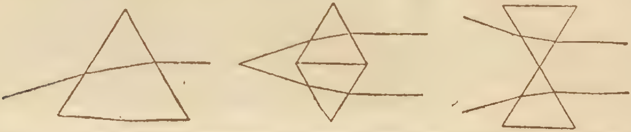
Focusing of images on the retina is brought about by the property of refraction. This happens when rays coming from the outer world pass through the substance of the cornea, the aqueous humour, the lens and the vitreous humour. Refraction is further increased, however, by the curvature of the anterior surface of the cornea and the anterior and posterior curved surface of the lens. These surfaces act like glass prisms. A prism is triangular in cross section, possessing a base from which two sides rise up to one angle or apex, as shown in the diagram. A ray of light which strikes one side of the prism, otherwise than at right angles to it, is bent towards the base, and, having traversed the prism, is bent further in the same direction when it emerges. If two equal prisms are placed base to base, the emerging rays meet at a point on the other side of the prisms from that on which is the source of the light rays.

Now, a structure like the lens, with surfaces bulging away from its centre, corresponds to the two prisms just described, and the surface of the cornea to one side of the two prisms. A bulge like that of the cornea or the surfaces of the lens is said to be convex. Were it in the opposite direction, that is, like two prisms placed with their apices touching rather than their bases, it would be a concave surface, and a lens with one or both surfaces like this would not bring rays of light to a focus, but would disperse them.

Rays of light coming from a small source about twenty feet away or further are practically parallel, and such rays, when the eye is at rest, are focused on the retina. Such an eye is called an emmetropic eye. If, however, the eye is shorter than the normal, parallel rays will be focused behind the retina; if it is longer than the normal, they will be focused in front of the retina; in either event there will be a blurring of the image actually formed on the retina. The former condition is called hypermetropia, and the latter myopia, or short sight.

A person with hypermetropia can focus the parallel rays on the retina, however, by accommodating, that is, making the lens stronger by bringing the ciliary muscle into play, but this induces fatigue when constantly in operation as it must be for ordinary vision, and therefore such a person is fitted with a convex lens which will form a clear image on the retina without calling on accommodative effort. A person with myopia, on the other hand, requires concave lenses in order to disperse somewhat the rays of light entering the eye, and thus throw the focus point further back and on to the retina.

After a person has reached the age of forty, changes are apt to occur in the lens which make it less elastic, and again convex lenses are necessary to compensate for lack of strength in the natural lens. This condition is called presbyopia.



EYE. In the eye the curvatures of cornea and lens act like glass prisms, deflecting the light rays in the manner shown in these diagrams

All these are known as refractive errors, and there is another which depends usually on the curvature of the cornea not being equal in all planes. Instead of being shaped like a circular watch-glass, it is shaped more like the bowl of a spoon. Rays of light are therefore brought to a focus at different points, and images are blurred. This defect is called astigmatism, and is corrected by putting a prism in front of the eye, so as to compensate for the unequal corneal curvature.

INJURIES AND DISEASES OF THE EYE. The skin around and below the eye is very lax, and an insect sting in this region is usually followed by considerable swelling. For the same reason a blow on the eye may result in free bleeding beneath the skin and much discoloration, in fact, a black eye. Treatment of a black eye is dealt with under the heading Bruise.

If a foreign body gets into the eye, the worst possible thing to do is to rub it. The eye should be kept closed while the nostril on the same side is blown briskly; this promotes a rapid flow of tears into the inner corner of the eye, possibly carrying the foreign body with them. A search should be made for it there and beneath the lower eyelid. If it is not found, the cornea should be inspected both from in front and from the side, and, if still unsuccessful, the upper lid should be turned over. The patient is directed to keep on looking downwards, while with the forefinger and thumb of one hand the person rendering first aid grasps the lashes at their roots and a narrow fold of the adjoining skin about the middle of the lid. A match or something similar is laid along the upper border of the lid, and while it presses downwards and forwards the edge of the lid is turned back over it. Great gentleness must be used.

Wherever the foreign body is found, it may be possible to lift it off with a clean piece of blotting-paper or the corner of a handkerchief. On no account should an attempt be made to rub a foreign body off the cornea. If it does not come off on blotting-paper, it is probably embedded, and rubbing will only implant it more deeply in the delicate cornea. Medical help should be secured at once.

A drop of castor oil is very soothing to the eye after the removal of a foreign body. When there has been a wound of the cornea or conjunctiva the eye should be protected with a loose eye-shade for a few days, and may, with advantage, be bathed with boracic lotion several times a day. If a foreign body has appeared to strike the eye with some force, but nevertheless cannot be discovered, a doctor should alway be consulted, as it may have been driven right into the eye, and, if it is left, will do serious damage by mechanical or chemical irritation or, possibly, by infection which it has conveyed into the eye.

Inflammations of the conjunctiva are described under the heading Conjunctivitis, and inflammation of the edge of the lid under the heading Blepharitis.

The lashes normally curve away from the eye, but sometimes are turned towards it, and cause much irritation ; this condition is known as trichiasis. It is more likely to happen if there is entropion, the edge of the lid turned inwards. Ectropion means that the edge of the lid is turned outwards, exposing the inner surface. Operative treatment is required to remedy these disfigurements. An enlargement of a Meibomian gland constitutes a chalazion : it is to be distinguished from a hordeolum, or stye (q.v.), which is suppuration at the root of a lash.

Inflammation of the cornea, or keratitis, may have several causes. Corneal ulcers are very painful, and tend either to spread over the surface, or to eat their way inwards and perforate. An ulcer causes much pain and intolerance of light, the muscles round the eye contracting firmly, and resisting efforts at opening, a condition styled blepharospasm. When an ulcer heals an opacity is left ; if faint and small it is called a nebula, if more pronounced a macula, and if white and dense, a leucoma. If near the centre of the cornea, it may seriously interfere with vision.

If the cornea is weakened by inflammation or ulceration, it may bulge forwards in the centre. A similar bulging due to atrophy of the corneal tissue is called keratoconus.

Inflammation of the iris, or iritis, may result from a wound in the cornea or may be due to blood infections, for example, syphilis, gonorrhoea or rheumatism. Commonly there is inflammation of the ciliary body, or cyclitis also, the condition being known as irido-cyclitis.

Opacity of the lens constitute cataract (q.v.). Floating specks in front of the eye, muscae volitantes, are seen in abnormalities of the vitreous humour, and in old people may be associated with the commencement of cataract; but they may be due to a disordered liver or to some other condition quite apart from the eye.

From the wounds perforating the ball of the eye a suppurative and general inflammation of the choroid, or choroiditis, may occur. In another form of choroiditis, from localised exudations into the membrane, white spots form in it; this condition may be found widely spread over the back of the eye, disseminated choroiditis, or may be localised. Syphilis is a common cause.

A blow on the eye may produce concussion effects in the retina, commotio retinae, or may rupture it. Inflammation of the membrane, retinitis, may occur from kidney disease, leukaemia, haemorrhage and other causes; it is commonly associated with inflammation of the optic nerve also, when the condition is spoken of as neuro-retinitis. It generally affects both eyes. Retinitis pigmentosa, a degenerative disease of the membrane, is usually associated with night blindness.

A swelling of the optic disk, papilloedema, is associated with increase in the pressure within the skull, say, from a brain tumour. This, or inflammation of the optic nerve, may be followed by atrophy of the nerve, or atrophy may occur independently; there is progressive loss of vision. Tumours may occur in the eyeball; one of these, glioma, is a malignant tumour which occurs in young children. Unless the eye is removed at an early stage there is grave risk of extension to the brain.

Paralysis of one or more of the muscles of the eyeball, or, on the other hand, spasm, causes squint, or strabismus, from which results diplopia, or double vision. Syphilis is a common cause of paralysis of the ocular muscles. When those supplied by the third nerve are involved, there is also drooping of the upper eyelid, or ptosis, though this condition may also be congenital. Fuller accounts of the commoner disorders of the eye are given under appropriate headings.

HYGIENIC MEASURES. When in perfect health, the whites of the eyes should be of a clear bluish-white. Redness shows that the eye is suffering from a slight cold or strain. Give the eyes a warm boric lotion bath three or four times a day, using a teaspoonful of boric acid powder to every ½ pint of hot water. To remove a yellowish tint from the whites of the eyes, drink a glass of hot water to which the unsweetened juice of a lemon has been added.

People who write or read a great deal often suffer from eye strain. This may be relieved by bathing the eyes in a solution of salt and water, a teaspoonful of salt and a quart of water. Pure cold water is in itself a good eye wash, or a weak solution of zinc sulphate will be made up by any chemist and is very good for tired eyes. After extra fatigue a strip of lint, moistened with water and laid on each eye and kept in place by a bandage for about ten minutes, is very helpful.

An eyebath is a convenient appliance for washing the eyes. This is a little vessel of glass or some other material, with its edge shaped to fit into the socket of the eye. It is filled with the lotion and the patient bends forward the head and applies the edge of the bath firmly round the eye. He then throws his head back and opens the eye widely. The lotion is kept in contact with the eye for a minute or two. The cleansing may be facilitated by opening and closing the eye several times while the bath is held in this position.

EYE, ARTIFICIAL. The use of an artificial eye is desirable not only to correct the deformity due to the empty socket, but to prevent further deformity from shrinkage of the socket and eyelids. The eye must fit well, however, otherwise it also will tend to induce shrinkage, and the eye and the socket must be well cared for. The eye should be taken out at night, cleaned from discharge and left to soak overnight in boracic lotion; the socket should be cleansed with a little lotion.

EYEBROW. If eyebrows are too thin a little red vaseline or cocoa-butter can be applied nightly with a small eyebrow brush, which is like a minute toothbrush in form. In applying any strengthening lotion care must be taken not to encourage the growth of hairs between the eyebrows. Some eyebrows have a tendency to meet over the nose. The use of tweezers keeps the line of the brows in good trim, unless the hairs are abnormally coarse, when electrolysis may be employed by a good operator. Brushing the eyebrows with a clean brush lightly smeared with a little brilliantine each morning tends to darken them and give them a silky appearance. It is possible to have the eyebrows and lashes tinted in any desired shade of brown or black.

EYELASH. The beauty of the eye depends to a great extent upon the eyelashes. They should be as dark or a shade or two darker than the hair. They can be painted at night with castor oil applied with a camel hair brush. If the eyelashes are inclined to be very straight they should be gently brushed upward over an orange stick laid along the edge of the upper eyelid. The use of a slightly astringent eye lotion containing witch hazel tightens the eyelids and prevents fall of the lashes.

FACE: CONTOUR AND CHARACTER

How to Preserve its Appearance of Youthfulness

Good health, and in no small degree good temper, are the factors that chiefly contribute to the preservation of the youthful contour that gives the human face a charm independent of sheer beauty. Nevertheless, angles, hollows and lines inevitably tend to appear in time, and women will appreciate the hints given here whereby the advent of these may be delayed and their effect minimised. See plate No. 25—and articles under the headings Beauty Culture; Neck.

The part of the front of the head between the eyebrows and the chin constitutes the face. The skin over this part is thin. It is freely supplied with sweat glands and also with fatty glands. The blood supply of the face is free, so wounds heal quickly, but as the veins communicate with those within the skull, septic infection, for example a carbuncle, may have serious results.

Movements are dependent on the integrity of the facial nerves, movements, that is to say, of the muscles of expression; the muscles which raise the lower jaw are supplied by branches from the trigeminal nerve, and this is also the nerve of facial sensation. The flat muscle which is included in the thickness of the cheek, the buccinator, and which is used for expelling air from the mouth as in blowing a trumpet, is supplied by the facial nerve.

Spasmodic movements of the face, or tics, may be due simply to habit and are often imitative, or they may follow facial paralysis when the function of the nerve is restored. In either of these circumstances re-education is a helpful line of treatment. Spasmodic movements of the face may also be due to chorea, and will probably be accompanied by twitching elsewhere.

An inveterate form of tic occurs sometimes in middle-aged people, beginning about the outer angle of the eye, and the only way of stopping it may be to paralyse the facial nerve. Spontaneous loss of sensation over one side of the face is likely to be due to hysteria.

CARE OF THE FACE. In creating an impression of good looks a clearly defined facial contour is of second importance only to a healthy skin. Comparatively few people possess regularity or fine moulding of features compared with the number who own in youth a well-shaped face. The trouble is that in neither case do a large proportion retain good facial contours into middle age. Sometimes deterioration starts with a wilted, sallow skin; later little hollows appear in cheeks and under the eyes, angles take the place of curves, the face sharpens and yet droops. In other cases superfluous flesh begins to accumulate, blurring the contour by the formation of a double chin, into which presently the flesh of the cheek and neck may merge, and the fine line of the jaw is lost.

It is of paramount importance to exercise sufficiently to promote healthy circulation. Breathing exercises (q.v.) are a good substitute for outdoor sports where these cannot be regularly indulged in by the sedentary worker. Besides attention to open air exercise, digestive troubles and constipation must be avoided by a healthy diet and special corrective exercises. A clean lower bowel is worth all the cosmetics in the world in ensuring a good facial appearance. Water drinking between meals often improves the facial appearance as it helps to cure constipation. A free use of water combined with a well balanced diet—including plenty of green vegetables and fresh fruit and milk—fresh air and regular breathing exercises will fill out and restore the temporary loss of facial contour.

Superfluous flesh in a youthful face will usually respond fairly quickly to correct diet and exercise when the desire to reduce is strong enough and certain simple sacrifices are made—such as cutting down sweets, cream, pastries, and not giving way to laziness. A good line of chin is most important to facial beauty. Erect carriage of the head has much to do with the clearness or flabbiness of this line, and all neck exercises help to keep the chin taut and prevent that blurred look which spoils the contour even when a double chin is not present.

Apart from neck exercises, described in their proper place, there are several methods of preserving and improving the shape of the chin. After applying skin cream to the face, smartly pat along the lines of the chin with the back of the hand to stimulate the muscles. Should there be a line or hollow just below the point of the chin and sagging flesh beyond, leave a small quantity of the unguent to soak into the hollow for a few minutes, and then, holding the cheek bones with the fingers of both hands, let the thumbs meet under the chin and gently but firmly bring them up to the fingers on either side, repeating the movement for about two minutes. This should be done daily after the first tendency to a double chin is noticed.

Another good precaution after washing is to dab under the chin an astringent lotion composed of one part of toilet vinegar to two parts of rose water. A daily treatment, which sometimes removes and certainly lessens a double chin, is to soak a pad of cotton wool in the astringent and with it knead and pat the muscles of the chin ; then to mould the pad under the chin so that it reaches well over the points of the jaw on either side, and to keep it in place by means of a chin strap. The pad should not be left on for more than twenty minutes, and skin cream should be patted into the chin immediately after to preserve elasticity of the skin. Chin straps are of silk or cotton material lined with rubber, or of rubber only, and can be worn at home to correct flabbiness under the chin.

Correctly applied massage can be used to increase or decrease, to smooth away lines and to tighten slack muscles. On the other hand it can, when incorrectly performed, cause the latter apparently to droop still more and aggravate an appearance of wrinkles. The unskilled operator of mechanically applied so-called vibromassage, with its injuriously violent vibrations, should be particularly avoided. Ultra-violet ray treatments and electrical massage are used by some beauty specialists; the former for removing skin blemishes and the latter for accumulated flesh under the chin. Obviously such treatments should only be received at the hands of an expert fully qualified to give them. (*See* Plate 25.)

Before a massage treatment, the skin must always be thoroughly cleansed either with soap and water or with a pad of cottonwool saturated with a mild tonic and smeared with a non-absorbent cream, lathered hands or pad being stroked upwards from the base of the neck with a firm but gentle pressure. Then light friction is given with the cushion part of the finger tips, working the lather or creamy deposit with circular spiral movements over the face. All facial massage should have an upward and outward tendency in order to correct the droop of the muscles. Some simple massage movements are described under the heading Beauty Culture.

FACIAL MASKS. Beauty packs or masks have been used from the earliest days of beauty culture. Animal, vegetable, and mineral substances have been pressed into service as chief ingredients. Mud masks and clay packs are variously recommended and applied in treatments or sold for home application. These packs are used to purge the skin of impurities and to refine it by reducing large pores. (*See* Plate 25.)

A bleaching pack for removing sunburn can be made from 2 oz. of almond meal mixed to a thick paste with a sufficient quantity of a lotion composed of 2 parts peroxide of hydrogen (10 vols), 1 part lemon juice and 2 parts rosewater. An egg pack for removing fine lines consists of first applying with a camel-hair brush the beaten white, allowing it to dry on the face, and then re-painting with the white, followed, when this is dry, with the application of the beaten yolk. Fine oatmeal makes a good ingredient for a pack intended to remedy a skin with enlarged pores. Into half a cupful of the cooked meal thoroughly stir 1 tablespoonful of glycerin and 2 of milk.

These masks should be worn for at least an hour. Afterwards bathe off egg or paste with warm water and pure soap, rinse with cold water, thoroughly dry the face and conclude the treatment by a light massage with an emollient and the application of an astringent to close the pores of the skin.

FACEACHE. Pain in the face is generally due to irritation of some branch of the fifth or trigeminal nerve, the source of the irritation being most commonly a decayed tooth. *See* Neuralgia; Tic Douloureux; Trigeminal Nerve.

FACIAL NERVE. The seventh cranial or facial nerve leaves the brain and travels into the inner ear in close proximity to the eighth cranial or auditory nerve. It now leaves this nerve, however, and passing through a bony canal, the Fallopian canal, beneath the floor of the passage connecting the mastoid antrum and the middle ear, and then downwards through the mastoid process, it emerges through the stylo-mastoid foramen, below and in front of the ear-hole. From here it wends upwards and forwards into the parotid gland, where it divides into superior and inferior divisions, from which branches are supplied to the muscles of the forehead and face.

The facial nerve is also known as the nerve of expression, as it activates the muscles by which changes of expression, wrinkling the brows, closing the eyes and so on, are brought about. If, therefore, the nerve is paralysed there will be a loss of expression on the corresponding side of the face. When the paralysis is due to cold, warmth is applied to the side of the face and perhaps blisters are applied. Later, recovery is hastened by electrical stimulation of the muscles. In other cases the cause, e.g., suppuration in the middle ear, must be treated appropriately and without delay. *See* Tic.

FAECES. The discharges of the bowel are called the faeces, though more commonly referred to as stools or motions. They consist of dead cells from the bowel lining, lime, magnesium, iron and phosphoric acid, bacteria, indigestible and undigested food, and a number of other substances.

The daily amount of faeces discharged by an adult usually is from 4 to 6 oz., half of which consists of bacteria, most of them dead. The faeces generally have a cylindrical form, and if flattened, or tape-like, obstruction in the lower bowel is suggested. In constipation and some other disorders the faeces may occur as hard balls. In diarrhoea, and after taking purgative medicines, the stools are more or less soft. In typhoid fever they are described as a pea-soup stool. In cholera the stools are profuse and watery, with whitish particles floating in the liquid ; such are called rice-water stools.

The colour of the stools may be dark from an excess of meat in the diet, or after taking fruit having a dark red juice, or red wine. Such drugs as bismuth, iron and manganese make the stools black, but where there is no such explanation, black stools are due to the presence of blood. The stools are pale when the diet consists mainly of milk, or milk-foods. Clay-coloured stools occur when the entrance of bile into the bowel is prevented, for example, by the obstruction of the main duct by a gallstone ; in this event the patient is also jaundiced. When the stools of an infant are green when passed, the colour is due to the activities of bacteria, not to bile pigment.

If an excess of fat is consumed, there may be fat visible in the faeces, otherwise this circumstance is due to poor digestion of fat, such as occurs in obstructive jaundice and in the absence or insufficiency of the pancreatic juice. Normally there is a little mucus or slime coating the faeces, but in some disorders, such as inflammation of the rectum or colon, dysentery, or intussusception (q.v.), there is a large increase of mucus; with this there is more or less blood as a rule. In mucous colitis, casts of the bowel, made of thickened mucus, may be passed. In countries where dysentery is prevalent, the passage of blood and mucus would at once suggest this disease, and in children anywhere the passage of such a stool concurrently with attacks of colicky pains would suggest intussusception.

A sandy-looking admixture in the faeces is called intestinal sand. It may be "true" sand, that is, with a large mineral content, or "false" sand, that is, composed of vegetable substances. The former denotes organic disease of the colon, and is most often found in mucous colitis. The latter occurs in those who have consumed large quantities of pears or similar fruit. Other abnormal contents of the faeces include gall-stones and other concretions, and intestinal parasites. These may be round or flat worms, visible to the naked eye, or their eggs, which can only be discovered by the microscope. *See* Constipation; Diarrhoea; Intestine; Rectum; Tenesmus; Worm.

FAINTING. The immediate cause of fainting is a momentary failure of the blood supply to the brain and the usual things that bring this about are pain, fright or other mental shocks, a close, oppressive atmosphere, cold or hunger. These operate by depressing the heart's action. Blurring of vision, ringing in the ears, giddiness or sickness may precede fainting, while bystanders will notice that the patient becomes pale and unsteady looking. He, or she, falls or sinks to the ground sometimes with a sigh.

In view of the cause, an obvious essential in treatment is to keep the head low. It may suffice to press down the head between the knees, but it is better that the patient should be lying down. On no account should an attempt be made to hold him up in a sitting position. A free supply of air should be obtained by keeping a crowd back; in a hot meeting-place the coolest air is at the floor. Tight clothing about the neck and chest should be loosened. If smelling salts are available the patient should be given an opportunity of inhaling them. When he is able to swallow, sips of water should be given, or better still, weak spirits or sal volatile. *See* Collapse; Dizziness; Unconsciousness.

FASTING. Fasting secures rest for the digestive apparatus and a short fast may be undertaken as a treatment for indigestion. It also helps to clear toxins out of the body so long as water is taken freely. After the first 24 hours the sensation of hunger is not urgent and after 48 hours it generally disappears. It is often desirable to begin a strict fast with a sharp purge in order to clear the bowel of possible sources of toxaemia. It is desirable, also, even for a short fast, to keep warm in bed. A fast for longer than a day or two should not be undertaken except under medical supervision. The meal which breaks the fast should be very small. *See* Starvation.

FAT. Adipose, or fatty tissue is widely distributed throughout the body but is absent from the cavity of the head and from the substance of some glands, such as the liver. With the exception of the eyelids and one or two other places, it forms a layer of varying thickness everywhere beneath the skin. Another layer occurs beneath serous membranes, and is especially abundant over the heart, around the kidney and intestines, and in the fold of peritoneum, the great omentum, which is disposed like an apron in front of the coils of intestine. The bone marrow contains a large quantity of fat.

Adipose tissue forms a storehouse of fuel for the body, which is replenished from fat and a proportion of the carbohydrates and even proteins consumed as food. It also serves to protect the body from external heat and cold and from physical injury. Delicate organs like the eyeball and vessels and nerves, which would otherwise be subjected to pressure, are surrounded by adipose tissue. For other organs, such as the kidneys and bowels, it serves as a support and its rapid disappearance in wasting diseases creates a tendency to visceroptosis, or dropping of the organs.

Adipose tissue consists of tiny globules containing liquid fat, each globule being a distended tissue cell. A general increase of fatty tissue is called corpulence, adiposity or obesity (q.v.).

A fatty tumour is called a lipoma ; this is described under the heading Tumour. An accumulation of adipose tissue amongst the essential structures of an organ is called fatty infiltration. This may occur, for example, amongst the heart muscles or amongst the fibres of voluntary muscles and occasions a degree of weakness varying with its amount. Should, however, the protoplasm of the tissue cells undergo an alteration so that tiny droplets of fat appear in them, this is called fatty degeneration. It occurs, for example, in phosphorus poisoning.

Animal fat mainly consists of a mixture of three fats, namely, olein, palmitin and stearin. A fat, if decomposed, splits up into glycerol, or glycerin, and a fatty acid, for example, oleic, palmitic or stearic acid, or a combination of these acids. If an alkali is present a soap is formed by the combination of this with the fatty acids, the process being described as the saponification of fat. This is an essential part of the process of the digestion of fats and is aided by emulsification, that is, the sub-division of the fat into minute droplets.

Vegetable fats are similarly constituted, though some contain other fats than olein, palmitin and stearin. An important difference is that vegetable fats do not contain the vitamins present in animal fats and essential to growth. Fat is an important source of body-heat, one ounce producing more heat than two ounces of either carbohydrate or protein. The consumption of fat is, therefore, greater in the colder countries. *See* Diet ; Food ; Obestiy.

FATIGUE. There are definite limits to the working capacity of the human machine, although there are considerable individual differences in this respect. A certain amount of work can be done at top pressure, but gradually the volume and quality decline, and if the task is continued in spite of these evidences of fatigue, a stage of exhaustion is reached.

There are two factors in the induction of fatigue, the using up of the energy-producing substance, and the accumulation of waste products. The waste material which matters most in muscle is lactic acid, and it is an interesting fact that when this acid is washed out of a fatigued muscle in laboratory experiments, fatigue disappears. Rest does the same for fatigued tissues in the ordinary way ; lactic acid is oxidised and destroyed.

The onset of fatigue is hastened by toxaemic states of the body, presumably because these lead to an earlier accumulation of waste products. The toxaemia may be due to chronic constipation or to some septic focus somewhere in the body. Toxaemia is combated partly by the secretions of the ductless glands, and, if long continued, these glands may manifest signs of exhaustion.

Fatigue is not limited to the part of the organism employed in a particular operation, but is experienced more or less by all the parts, so that it is not always correct, as used to be said, that the best rest is a change of occupation. It is true, however, that within limits more work can be achieved with the same expenditure of energy if the element of change is introduced into work, so long as the fresh work is quite familiar.

It has also been found that good conditions in workshops, as regards ventilation, lighting, heating and comfort, do much to delay the onset of fatigue in the workers. Moreover, the output when the working hours are unduly long is less than when the hours are reasonable. The mental outlook is an important factor: cheerfulness and interest delay the onset of fatigue ; low spirits, discontent and worry hasten it.

The sense of fatigue is removed by caffeine, hence the popularity of tea, coffee and other beverages which contain it. An excessive consumption of such beverages, however, to make possible an undue expenditure of energy, is likely to be followed by exhaustion probably because there is dissipation of the energy-producing substances in the cells. Consequently it may require a prolonged rest before vigour is re-established.

Excess of work, worry, or drugs may result in neurasthenia or psychasthenia, or in conditions akin to these, though many people are constitutionally in such states ; they are " born tired." In some of these cases, perhaps many, it may well be that there is a dissipation of energy by emotional conflicts. *See* Auto-intoxication ; Exercise ; Psycho-therapy ; Rest ; Ventilation.

FAVUS. A skin disease, uncommon in Great Britain, but prevalent in different parts of Europe, favus is caused by a vegetable parasite, a fungus known as achorion Schönleinii. It affects children mostly, and is usually found on the scalp.

A crust appears on the skin in the form of a tiny, round cup, from the centre of which a hair projects. The crust is golden-yellow in colour, and when a number are adherent together, an appearance is caused which suggested for the disease the name of honeycomb ringworm at one time applied to it. When crusts have dropped off, the scalp is hairless and scarred ; this scarring and baldness are permanent. Hairs in the affected areas are lustreless and broken. There is no discomfort beyond some itchiness.

The crusts must be removed, and, to soften them, a boracic fomentation, or an ointment containing 20 grains of salicylic acid to the ounce, may be used. The hairs must be removed, and the best method is by X-rays in the hands of an expert, or, if this is not available, by pulling out a few at a time with epilating forceps. To kill the parasite, tincture of iodine should be applied freely to the head. *See* Ringworm ; Scalp.

FEBRIFUGE. *See* Antipyretic.

FEEBLE-MINDED. In the customary classification of degrees of mental deficiency the epithet feeble-minded is restricted to those who are the least deficient, those whose mental endowments are more scanty being described as imbeciles and idiots. Some notion of what is meant by such terms respectively may be gathered from a comparison with the mental equipment of a normal child. Thus, a person who corresponds mentally to a child of about two years old is called an idiot, to a child of from three to seven years, an imbecile, and to one of from eight to twelve years, a feeble-minded person or moron. The persons who are more particularly included in the above classification are such as have been mentally deficient from birth, though one would probably include also those who, presumably normal at birth, have suffered deterioration in early childhood.

Congenital mental deficiency may depend on a constitutional or inherited weakness of the brain, on disease of the brain occurring before birth, or on a brain injury before or during birth. Addiction to alcohol by one or both parents is cited as one of the possible causes of enfeebling the brain of an unborn child.

In the form of idiocy associated with a defect of the thyroid gland and known as cretinism, the administration of thyroid extract, if begun sufficiently early, may effect a cure, though the drug must be continued throughout life. The only thing to be done for mental deficiency from other causes, however, is to educate the child as skilfully as possible.

Amongst feeble-minded persons are included those suffering from so-called moral imbecility, for though such might appear to the ordinary observer to suffer from no mental weakness in the ordinary sense, even, in fact, to be especially well endowed, their inability to understand the ordinary moral standards and their lack of susceptibility to moral claims must indicate some serious defect in the texture of their minds. The proper control of this type of feeble-mindedness is a most difficult problem.

It is also a disconcerting fact that very many people who are feeble-minded, but of a sufficiently high grade to enable them to earn their living, at any rate in a sort of way, are marrying and producing children who inherit the defects of their parents, so increasing the number of those for whose support society must provide, partly or wholly.

Much has been done by legislation to safeguard the interests of the mentally deficient. *See* Degeneration; Idiocy; Mental Disease.

FEMUR. The thigh bone, or femur, is the longest bone in the human body. Its upper end consists of a rounded head and a portion called the neck which unites the head to the shaft of the bone. The head is fitted into a cavity in the pelvic bone, called the acetabulum, to form the hip joint, and from this the neck passes downwards, outwards, and slightly backwards to make an angle of about 125° with the shaft. The shaft of the bone consists of a cylinder of dense bone. The lower extremity is thickened and presents a rounded eminence, or condyle, on its outer and inner aspects which are covered with cartilage and articulate with the upper surface of the head of the tibia to form the knee joint.

In children and adolescents it may happen that the neck of the bone comes to make a smaller angle with the shaft than 125°; it may become horizontal or even pass upwards to the shaft instead of downwards. This deformity is known by the name of coxa vara, and the origin of its development is found in the softening of the bone.

It is not uncommon for the neck of the femur to be broken especially in elderly people, and possibly from mere jarring of the bone. Sometimes the neck is driven into the expanded bone at the top of the shaft, and fixed there. This is called an impacted fracture, and it may permit of the patient walking so that the existence of the fracture might be overlooked. Whenever possible, in an elderly person, the limb is fixed in a Thomas's splint and a patten provided for the other foot, so that the patient can get about on crutches. If confined to bed, there is a great risk of death, probably from pneumonia. First-aid treatment of a fractured femur is shown in Plate 30. *See* Bone; Fracture; Hip; Innominate; Knee; Thigh.

FERMENT. A ferment is defined as a substance which is capable of causing chemical changes in another substance, with which it comes into contact without itself undergoing any change. Yeasts and bacteria are sometimes called living or organised ferments, as distinguished from soluble ferments, such as the pepsin of the gastric juice. The latter are also called enzymes.

Ferments are of enormous importance to animal and vegetable life and very many are produced and exercise activity in the human body. The coagulation of milk in the stomach, for example, is brought about by the ferment rennin, proteins are reduced to an absorbable form by the ferments pepsin and trypsin, fats are split up by the ferment lipase, starch is converted into sugar by ptyalin and amylopsin, and so on. *See* Digestion.

FEVER: ITS NATURE AND STAGES

Nature's Defensive Action Against Microbic Invasion

The reader will appreciate the careful information given in this article about the symptoms and stages of various fevers, their treatment, and the precautions to be taken against the spread of infection. Other details of description and treatment are given in connexion with each fever to which they are applicable

The normal body temperature is usually about 98·4° F., though it may reach 99° F. without anything being wrong, as, for example, during digestion or after hard exercise. When the temperature is higher than this, however, a state of fever, or pyrexia, is said to exist, or if the temperature is over 105·8° F., hyperpyrexia, a dangerous condition because merely to be so hot as this, without other noxious influence, might be sufficient to kill a person.

By far the most common cause of fever is the invasion of the body by microbes. The acute infectious fevers constitute a group of diseases marked by a more or less definite course, each fever being characterised by particular symptoms. There is a well-founded belief that when fever occurs in connexion with microbic invasion, it represents part of the effort which the body makes to repel the invasion, and, so long as the temperature keeps within bounds, an attempt to depress it is likely to be mischievous.

The only reliable means of discovering fever and its degree is to use a thermometer. It is usual for the temperature in fevers to be higher in the evening and to fall towards morning, but occasionally this sequence is reversed. When there are intervals of normal or subnormal temperature, lasting from some hours to two or three days, between bouts of fever, the fever is said to be intermittent; when the temperature does not reach normal, but the difference between the highest and lowest readings exceeds 1·5° F., it is called remittent, or, if the difference is only 1·5° F. or less, continued fever.

In a febrile disease the temperature may rise rapidly, that is, within the course of a few hours, or it may not reach its high level till a few days have elapsed. Similarly, it may decline by a sudden or by a gradual drop, the former being called termination by crisis and the latter termination by lysis. The crisis is usually accompanied by profuse sweating, by a large flow of urine or by diarrhoea.

The various acute specific fevers have characteristic symptoms and signs which distinguish each, but there are symptoms common to all, those associated merely with the febrile state. The patient may feel out of sorts and uncomfortable, his condition being aptly expressed in the word malaise. He may feel shivery, and in some cases there are severe shiverings or rigors. In children fevers are not uncommonly ushered in by convulsions, which at this age are the equivalent of a rigor. There may be a general feeling of soreness in the muscles and sometimes neuralgia.

The pulse rate is almost always more increased, typhoid fever being a notable exception in this respect, and it is generally found that the pulse rate is increased by eight to ten beats for each degree of rise of temperature. The breathing rate is proportionately increased. All the secretions of the body are diminished and so the skin is dry, the mouth is dry, the urine is diminished and high-coloured, and there is a tendency to constipation. The tongue is furred, there is thirst, and, as a rule, loss of appetite. Usually there is some headache, and there may be delirium; children become delirious in comparatively slight febrile attacks.

Slight fever does not prevent a person from being up and about, but it disappears earlier if rest be taken, and if there is any decided degree of fever, the patient must go to bed. There should be just a sufficiency of bedclothes, and the room should be well ventilated. For this purpose it is best to have a window always open, and the more widely open it is the less draught. If a draught plays on the bed, a screen should be placed where it will prevent this. Lights should be shaded, and there should be no noise in the sick-room, creaking doors or furniture being very objectionable.

Diet should be light, the main item being milk, which may be diluted with hot water, barley water or soda water. Two pints or more of milk should be taken in the 24 hours, a feed being given every two hours. One or two of the feeds may be replaced by one of beef tea or a meat extract, especially if the bowels are constipated. If the bowels are loose, on the other hand, meat extracts should be withheld, and the milk may be boiled and diluted with lime water. Water should be taken freely, some of it in the form of home-made lemonade, or, if the bowels are constipated, Imperial drink.

Each day the patient should be washed all over, but piecemeal, so as to avoid unnecessary exposure. The mouth should be cleansed several times during the day. In continued fevers it is a good plan to have one bed for day use and another for the night. It is especially necessary to guard against bed sores (q.v.).

It is common to give a simple fever mixture such as the following:

Sweet spirit of nitre	½ ounce
Liquor of acetate of ammonium	1 ounce
Syrup of oranges	4 drachms
Camphor water	to 6 ounces

A tablespoonful for an adult, or a teaspoonful for a child, every 3 hours.

This helps to keep the skin active. At the commencement of the illness 10 grains of aspirin may be given to relieve headache or muscular pains, if necessary; or if this is unsuccessful, 7 grains of phenacetin with 1 grain of caffeine citrate. As a rule, there should be as little drugging as possible. One or two layers of gauze wrung out of iced water and placed on the forehead will help to relieve headache. They should be frequently renewed.

Should the temperature rise above 102.5° F., the patient can be sponged with tepid or cold water, to which has been added a little vinegar or eau-de-Cologne, one part at a time, as in washing. If the temperature continues to rise, he may be placed in a wet pack, made with tepid or cold water.

If there is much delirium, a tepid or hot pack will be likely to do good, whatever the state of the patient's temperature. Such treatment may also be adopted to procure sleep when necessary. It is important that the patient should have sufficient sleep, and in short illnesses it will rarely be desirable to wake him in order to give food.

FIBROSIS. The development of fibrous tissue is described as fibrosis. The essential elements of glands and other active tissues are separated, more or less, by connective tissue, which binds them together and supports them. Wounds or gaps in tissues caused by disease are repaired by this connective tissue from which new cells are formed and later developed into fibres.

In the same way a focus of irritation may be surrounded and sealed off, as it were, by new fibrous tissue. This is a common event when tubercle bacilli have invaded the lung. It may happen, however, that fibrosis is not a limited process, but either is widely diffused through an organ or by gradual extension becomes so. This may take place in the liver, kidney, heart wall and other places, and termed cirrhosis.

The pressure of the new tissue in the first instance, and later on the compression caused by its contraction, result in the functional power of the organ being impaired.

FIBROSITIS. Inflammation of the connective tissue which is widely distributed in the body, is called fibrositis. Muscular rheumatism, so-called, is of this nature, but, while the rheumatic poison may sometimes be responsible, other poisons produce the disorder and notably those from septic teeth or a septic throat.

The inflamed tissue is first enlarged by an exudation of fluid so that it forms a soft and ill-defined swelling, which may become more defined, however, if it is massaged. New cells are also produced and these accumulate and in time are converted into fibrous tissue forming a strand or knot. When the swelling occurs it presses on nerves and may give rise to intense pain. This abates when the swelling has diminished sufficiently and should the mischief be cleared up there may be no more pain, but should a sufficient amount of new tissue be formed, leaving strands or knots, these are apt to swell up, particularly at a change of weather. This explains the recurrence of pain at the site of an old fibrositis.

Fibrositis in certain situations receives a special name; thus when occurring in the lumbar region it is called lumbago, or in intercostal muscles, pleurodynia. It is the commonest cause of the affection known as stiff neck.

In acute fibrositis the most urgent duty is to relieve the pain, but at the same time a search must be made for some septic focus which should be cleaned up promptly.

The most effective agents for relieving pain are heat and massage, or a combination of these. Heat may be applied in a variety of ways such as a hot bath, a hot-air bath, a radiant heat bath, poultices, hot fomentations, or hot-water bags. Massage should be gentle when done over tender spots, but often the pain decreases under gentle massage and permits of firmer movements. An attempt should be made to discover the swellings or nodules above referred to, and these should be rubbed away as it were (*see* illustrations, Plate 28). A useful method of combining heat and massage is ironing the part with a hot iron. The skin is protected by a layer of brown paper or flannel and the pressure of the iron regulated according to the weight able to be borne.

Drugs may be of some use. The bowels may be cleared by giving 3 grains of calomel at bed-time and 120 grains of Epsom salts in a third of a glass of water in the morning. Aspirin, in 10-grain doses, or 5 grains each of aspirin and phenacetin often give relief. The patient should be kept warm and should avoid draughts; woollen or flannel underclothing should be worn.

In slighter cases, or when improvement has occurred in severe cases, rubbing the part with a liniment, such as equal parts of methyl salicylate and olive oil, will generally suffice. After rubbing, the part may be covered with capsicum wool or with flannel. *See* Back-ache; Pleurodynia; Rheumatism.

FIBULA. The long slender bone on the outer side of the leg is called the fibula. It articulates at its upper and lower ends with the tibia, but, whereas it takes no part in forming the knee joint, its share in forming the ankle joint is an important one. The lower end of the bone is enlarged to make the external malleolus or prominence of the ankle. When one turns over on the ankle, as in stepping off a kerb for instance, the ankle may simply be sprained, but it may happen that the pressure on the fibula causes a fracture of the bone in its lower third. This is called a Pott's fracture, and it usually takes place about 3 in. above the tip of the lower end of the bone. The foot is twisted or even displaced outwards. A more severe degree of displacement, upwards as well as outwards, occurs in Dupuytren's fracture, in which the lower end of the fibula is separated from the tibia.

The first-aid treatment of these fractures is to pull steadily but gently on the foot until it is placed at right angles with the leg, with the sole in its natural position, and then fix the foot by inner and outer splints, or, failing splints, by tying the legs and ankles together. *See* Extension; Fracture; Leg.

FIDGETS. Jerky and purposeless movements occurring in children may be due to tic (q.v.) or habit spasm, to chorea or St. Vitus's dance (q.v.) or may simply represent fidgets, movements that are distinguished from those of a true tic by their not being so much confined to one muscle group and by not being so persistent. Fidgets tend to occur in highly strung children when excited from fear or some other cause and are more likely to occur if the child is over-tired. Fidgets may also be an expression of fatigue in older persons.

FIGURE: THE HALL MARK OF FITNESS

How to Develop and Preserve a Graceful Body

How the laudable desire of every right-minded person to have a good figure may be gratified is shown in the following pages. Even lack of symmetry due to constructional faults can be corrected if attended to early, and living according to hygienic rules will develop grace of line and keep the figure youthful throughout long years. See Beauty Culture; Breathing Exercises; Diet; Exercise

The foundations of a good figure are laid in childhood. With ordinary health, if hygienic rules have been observed throughout life, a slender, strong, graceful body may be developed, which with a little care and trouble will retain youthful lines well into middle life and even into old age.

Diet (q.v.) is a most important factor, while exercise, fresh air, proper breathing, correct carriage of the body, an understanding of the art of relaxation, and sufficient sleep all contribute towards moulding a good figure. Moderation in all things is one of the secrets of keeping a youthful body. Outdoor games of all kinds should be encouraged to develop healthy growth of bone and muscle. Both swimming and dancing in the open and rowing are especially beneficial, while fencing gives added poise and alert precision of movement.

Beauty of figure demands strong, perfectly controlled muscles, but over-development destroys their elasticity and coarsens the shape of the body. It is now realized that any beneficial system of exercises embraces the needs of all the muscles concerned and avoids those movements which have a tendency to reduce or enlarge parts of the body inharmoniously to the whole. Special attention must be given to the tone and strength of the all-important muscles which form the abdominal walls and floor of the pelvis. These should be kept at all times well retracted and be thoroughly exercised night and morning. In this way the so-called " middle-aged spread " can be avoided.

Corrective exercises are of little value if the figure is carried wrongly through the day. Elasticity of the spine is lessened by the habit of sitting for long periods in a crouched-up position which distorts the natural curves of the back. Beauty of figure is aided by a cultured walk where this is not naturally graceful. The practice of walking, without heeled shoes, along a straight line, placing the weight of the body on the ball of the pointed foot and slowly lowering the heel to the ground, still keeping the weight forward, before pointing the other foot, using exaggerated slowness and precision over each step, shows up and improves defects in balance. The exercise is rendered more beneficial after a little practice by placing a book on the head and carrying a stick passed behind the small of the back and in front of the bent elbows.

The carriage of the body should not be handicapped by unsuitable clothes. Badly fitting or down-at-heel or excessively high-heeled shoes can throw the whole balance out and weary the muscles with an effort to adjust it. Tightness of corset or brassiere defeats beauty by giving the figure a rigid look, besides being bad from the health point of view, and whatever the fashion, walking skirts should be wide enough to allow the length of the stride that is graceful in proportion to the height.

Redundant flesh resulting from indulgence in too much rich and attractive food can be reduced by cutting down sweets, cream, bread, thickened gravies and sauces and drinking unsweetened lemon-juice and hot water the first thing in the morning and last at night. Puddings and pastry should be abandoned by those with a tendency to superfluous flesh. Eating sweets and ices, or drinking syrupy beverages between meals, should also be taboo. The great thing is to reduce over-weight in time before the figure has spread excessively.

Sluggish elimination leads to flabbiness of muscle and excessive deposits of fat, and is therefore fatal to the preservation of suppleness. Constipation should be avoided, the skin kept active by means of cold or tepid baths followed by brisk friction, and waste products thoroughly exhaled from the lungs by deep breathing exercises.

It is a good plan to stretch the body thoroughly on waking in the morning. This can be done in bed, extending each leg in turn, first with the foot out straight and then vertical, to stretch the muscles front and back of the legs. The pull should be felt on each hip. Then the arms should be stretched and the hands rotated. Relax the arms and hands and let the latter flap from the wrists.

The following exercises done systematically are particularly helpful. No restrictive clothing should be worn. First do four, starting from a position lying on the back on the floor.

Exercise 1. Bend both knees till feet are flat on the floor; describe a circle with the right knee five times; repeat with the left knee; then with knees close together five times to the right and five to the left. This strengthens the abdominal muscles and reduces the hips.

Exercise 2. Raise legs at right angles to body and swing slightly to the left and then to the right, ten times. Bend the knees until the feet touch the floor, then straighten the legs. This is another abdominal exercise.

Exercise 3. Lift left leg at right angles to body. At the same time touch the floor above the head with the right arm.

Repeat a dozen times alternately, using the right leg and left arm. This exercise expands the chest and lifts the ribs.

EXERCISE 4. This provides hip and thigh massage. Lying on the back, extend the arms at shoulder level, swing the right leg across the body and up towards the left, as shown in Plate 27. Repeat ten times and then swing the left leg.

EXERCISE 5. After these floor exercises take standing position, raise both arms above the head, and keeping the latter erect and the top of the arms on a level with the ears, rise on the toes, bend both knees forward and descend to the position shown in Plate 26. Keep the shoulders well back, then lower heels to the ground, pause for five seconds, and repeat exercise six times.

EXERCISE 6. Stretch the right leg out sideways, pointing the toe till it touches the floor. Then, while bending the left knee, raise left arm above head and grasp the back of the neck as illustrated in Plate 26, with the right hand resting on the right thigh. Feel the pull on the muscles of the hips, knee and the shoulders. Repeat this exercise, beginning with the left leg.

EXERCISE 7. Grip the back of a chair with the left hand, lean slightly forward and swing the left leg from the hip (*see* Plate 26), keeping both legs as straight as possible and taking all the strain on the hips. Hold the head up and the neck in line with the torso. Reverse position and swing with right leg.

EXERCISE 8. From a standing position spring out with arms extended to the position indicated in Plate 26. Then return to position of attention and repeat with other leg. These two last exercises will improve the poise and carriage of the body.

FILARIA. In tropical and sub-tropical countries the human body may be invaded by various species of parasitic roundworm belonging to the genus filaria. One of these is the guinea-worm (q.v.). Infestation with species other than the guinea-worm is called filariasis.

The embryo of three species may occur in the blood, and are collectively known as filaria sanguinis hominis. Of these, filaria bancrofti or nocturna, is the most important. Its embryo is known as microfilaria nocturna because it invades the peripheral blood stream only at night between about 7 p.m. and 7 a.m. The adult worms are from three to four inches long, and tend to cause irritation and obstruction of lymphatic channels. Thus there may be lymphangitis, with painful swelling of a limb and irregular fever, described as elephantoid fever. Other results are chyluria or the discharge of milky-looking urine ; chylocele, a swelling in the scrotum resembling a hydrocele (q.v.) but containing a milky fluid ; lymph scrotum, or distension of the lymphatics of the scrotum ; or enlargements of the glands in the groin. Another possible consequence is the enormous enlargement of a limb, the scrotum or some other part, to which the name elephantiasis is given.

Injections of arsenical preparations and of tartrate of antimony have been followed by a great diminution in the number of microfilariae in the blood and moderation of the swelling and other symptoms caused by obstruction of the lymphatics. *See* Elephantiasis; Guinea-worm; Lymphatic System.

FINGER. There are three bones in each finger, as contrasted with the thumb, which has only two. These bones are spoken of as phalanges (singular, phalanx), and a joint between them as an inter-phalangeal joint. The joint connecting a finger with the rest of the hand is called a metacarpo-phalangeal joint, and resembles a ball-and-socket joint, an inter-phalangeal joint being of the hinge variety. The fingers are distinguished as the fore or index, the middle, the ring and the little finger, the first being most highly mobile and most highly developed as regards touch.

Flexion is brought about by muscles in the forearm, whose tendons pass down in the palm of the hand to the fingers, and, at the metacarpo-phalangeal joint, by four small muscles known as the lumbricals. Extension is caused by forearm muscles. The tendons, or sinews, of the forearm muscles are enclosed in synovial sheaths, but in the index, middle and ring fingers there is a distinct separation between the sheath covering the tendon in the finger itself and that covering the tendon in the palm and wrist. In the little finger, as in the thumb, the sheath is continuous. From this it follows that suppuration, for example, from a whitlow in the little finger, if it reaches the synovial sheath, may spread upwards and cause an abscess in the forearm; this is unlikely to happen from suppuration in the other fingers.

Various congenital deformities of the fingers occur, such as an excessive number, or polydactylism; or the fingers may be contracted, or bent, a deformity which has to be distinguished from Dupuytren's contraction (q.v.). Often such deformities are inherited. In what is called a mallet finger the end phalanx is flexed, probably from damage to structures on the back of the finger. A trigger, snap, spring or jerk finger is one in which the straightening of the finger cannot be accomplished at once, and when it does take place, does so in a jerky fashion.

In tuberculosis of the lungs, emphysema and other lung diseases, and in malignant endocarditis, the fingers may be swollen at the ends, or, as it is called, clubbed. In osteo-arthritis little, hard nodules may form on the sides of the end phalanx. Deposits of urate of sodium, or tophi, may occur at the finger joints in gout. The condition known as dead fingers occurs in Raynaud's disease. *See* Hand; Nail; Poultice; Sensation; Thumb; Whitlow; Wrist.

FIRE-GUARD. Young children should not be left alone in a room with a fire unless there is an efficient fire-guard. If a child under seven years of age dies or suffers severe injury from neglect of this precaution it constitutes a punishable offence as regards anyone over sixteen who has the care or custody of the child.

FIRST AID FOR THE INJURED

How to Act until Medical Help Arrives

The following article contains information that will be especially useful to persons who are temporarily remote from medical assistance as well as others. The instructions are supplemented by information under such headings as Bandage; Bruise, etc.

Everyone should be acquainted with the principles of first aid, as emergencies are constantly arising in which immediate treatment, pending the arrival of a doctor, may obviate the more serious consequences of injury or sudden illness.

An accident may result in a fracture or a dislocation or bleeding, or many other things, but there are certain general principles in the treatment of accidents which may here be noted.

The apparently natural tendency of passers-by to crowd closely round the stricken person must be prevented, and a free supply of air must be procured. Another impulse which must be checked is to make the fallen person sit or stand. As a general rule a man who has fallen does so because he cannot stand, and the effort to make him stand may do him grave injury.

To take the simplest accident, which is fainting—it may easily be shown that the act of falling is part of Nature's mechanism for curing the state of affairs which brought about the faint. Fainting is due to an insufficiency of the blood supplied to the head, and this blood supply is made much more easy when the head is on the same level as the rest of the body than when it is uppermost. Tight clothing about the neck and chest should be loosened. If there is bleeding the wound should be sought for, and someone should put his thumb on it and keep it there. Many a life has been saved by this simple procedure.

The injured person will certainly be offered water and alcohol. If he has merely fainted the alcohol will do him good, if he is bleeding the alcohol will increase the haemorrhage and so do him harm. This is true whether the bleeding is external and visible or internal and invisible, as in an apoplectic stroke. Unless the person rendering first aid is quite competent to distinguish between simple fainting and more serious conditions, alcohol should most certainly be withheld.

Except in the case of the slightest injuries, a doctor should be summoned at once, and should there be difficulty or delay in securing the services of one, the patient should not be moved till it is clear that he has no bones broken. If he has sustained such an injury, splints must first be improvised and applied.

One result of accidents in general is what is called shock. This is more serious in children, but is observed in some measure in almost every accident, and next to bleeding it is the most important thing to control. To this end efforts must be made to make the patient warmer by extra clothing, chafing his limbs, etc.

In the following pages brief instructions are given for dealing with emergencies. The reader is also referred to individual articles.

BRIEF INSTRUCTIONS FOR EVERYDAY EMERGENCIES

ANIMAL BITE.

Animal obviously healthy. Wash wound with warm water or antiseptic lotion: antiseptic dressing.

Animal possibly rabid, or viper bite. Arrest circulation. If limb, apply tourniquet (*see* below) to upper arm or thigh as case may be; if a finger, grasp at once firmly round the root.

Suck; encourage bleeding; wash with warm water or antiseptic lotion. No danger in sucking if no broken surface about mouth.

Warmth and stimulants if necessary.

See a doctor as soon as possible.

Possibly rabid animal should *not* be destroyed at once.

Improvised tourniquet. Put stone about width of five-shilling piece, or similar hard object, as a pad, in centre of folded handkerchief or triangular bandage. Place pad over main artery; tie handkerchief loosely round limb; put stick through loop thus made: twist till bleeding stops.

ARTIFICIAL RESPIRATION.

Ascertain that mouth and throat are clear; loosen tight clothing at neck and chest.

Lay face downwards, head to one side, arms forward as illustrated in Plate 3. Kneel alongside, level of hips, hands on lower ribs, thumbs parallel and near spine. Stoop forward with arms straight; count slowly, 1, 2, 3, keeping hands on chest, spring back to take off pressure; count, slowly, 1, 2. Repeat till natural breathing is established.

When breathing established, but not before, give coffee or weak spirits; chafe limbs; hot bottles.

BLEEDING.

Free external bleeding. Put finger or thumb at once on bleeding spot; replace finger by firm pad of antiseptic dressing or clean rag as soon as ready; if necessary, press on main artery of part, first with fingers and then, in case of limb, by improvised tourniquet.

If bleeding from limb, lay patient down and elevate the limb; remove garters and other constrictions.

Summon doctor at once; no stimulants meanwhile.

Oozing of blood. Press firmly with pad of antiseptic or clean fabric.

Nose-bleeding. Lay patient down; cold water on forehead; do not blow nose; if necessary, stuff clean white silk handkerchief, gauze or rag into nostril.

Bleeding from socket of extracted tooth. Make firm pad of clean handkerchief and bite on it.

Spitting or vomiting blood. Summon doctor; lay patient down, shoulders raised; plenty of fresh air; warmth to feet; reassure patient.

BRUISE.

Cold application (layer of muslin or other fabric kept moist with water, perhaps with addition of eau-de-Cologne, spirits, or vinegar); rest injured part by means of sling, etc.

BURN.

Skin not broken. Vaseline; carron oil, boracic vaseline, boracic powder, or thick paste of bicarbonate of soda.

Skin broken. Boracic lint moistened or rag dipped in antiseptic lotion.

Severe burn of child. Place in warm bath and then undress; child seriously burnt is generally quiet.

To uncover burn. Do not pull away clothing; first cut round, then soak off. Place severely burnt limb of adult in warm bath.

In case of severe burn. Summon doctor at once, and meanwhile give small doses of stimulants.

Person on fire. Wrap blanket, rug, or coat round and roll on floor.

CHOKING.

Pass finger or handle of spoon along inside of cheek to back of throat; hook foreign body forward.

If teeth clenched, handle of spoon between back teeth and turn on its edge; slap smartly between shoulders.

When foreign body out, if breathing ceased, employ artificial respiration.

COUGH.

Suck pastille; equal parts hot milk and soda water with pinch bicarbonate of soda; cold compress to throat (folded handkerchief or lint, wrung out cold water, covered with oiled silk or brown paper); inhalation of steam from jug of nearly boiling water to which teaspoonful Friar's balsam added.

CRAMP.

In legs, apply cold plate to sole of feet; massage.

CROUP.

If breathing difficult and child's face dusky give one drachm of ipecacuanha wine to cause vomiting and repeat this if necessary.

CUT.

Arrest bleeding (*see* Bleeding); if small, dab with tincture of iodine or Friar's balsam; any larger cut, cover with antiseptic dressing; bandage.

EAR.

Foreign body (*e.g.* pea or insect) in; put in a little warm almond or olive oil. Do not syringe, except on doctor's orders. Make *no* attempt to extract by hairpin or any other instrument.

EARACHE.

Drop warm almond oil in ear; roast common salt on shovel, put in small flannel bag and apply.

ELECTRIC SHOCK.

Turn off current at main or, to remove patient, stand on pile of dry clothing, hands gloved.

EYE.

Foreign body in the eye. Wash freely with warm water; dip face in basin of warm water, opening and closing eye while under water; draw down lower lid, remove foreign body with corner of handkerchief. Turn up upper lid over match while patient looks down at his feet, remove as above.

Do not attempt to rub foreign body from clear part of eye.

Irritation after removal of foreign body. Drop of castor oil. If any difficulty, see doctor at once.

FAINTING.

Lay flat on floor, loosen tight clothing, neck, and chest; snuff smelling salts. When able to swallow, sips of water, weak spirits or sal volatile in water.

FIT.

Summon doctor; meanwhile:

Child—warm bath, cold cloths to head.

Adult—keep lying down, head slightly raised; no attempt to prevent movements, but restrain if very violent; stick or handle of tooth brush between back teeth to prevent biting tongue; loosen tight clothing, neck and chest; allow sleep 2 or 3 hours.

FRACTURE.

Do not move before broken bone is fixed by splints, etc. Bleeding, arrest (*see* Bleeding). Summon doctor.

Splints: umbrella, walking-sticks, broom handle, cardboard, tightly rolled newspapers, etc.; if legs, tie together, above and below. Pad splints with coats, etc.

FROST-BITE.

Or chilling feet, hands, nose, or ears. Do not bring near fire, do not use warmth. Rub with snow or cold water till circulation restored.

GAS POISONING.

Don't use naked light. Protect mouth and nose with damp cloth; turn gas off; open window or knock out pane with some implement; remove patient to landing or further if air not fresh. If breathing weak, artificial respiration at once.

GIDDINESS.

If stomach upset, induce vomiting by tickling back of throat; to make vomiting easier give tepid water in large draughts; dose of castor oil; and if constipated an enema of soap and water.

If severe, keep lying down, mustard plaster to nape of neck; darken room.

HEADACHE.

Fresh air; cup of tea; half teaspoonful sal volatile in water; mustard plaster nape of neck; cold application to forehead (*see* Bruise); aspirin.

HEART-BURN.

Half teaspoonful bicarbonate of soda or magnesia in water; light food; no greasy food or pastry.

INSECT BITES.

Bathe with solution of ammonia, of bicarbonate of soda or of permanganate of potash. Bites sometimes prevented by spraying cuffs and stockings with compound tincture of lavender and dabbing exposed parts with same. Mosquito bites prevented by dabbing exposed parts with solution of Epsom salts. (*See* Sting).

ITCHING.

Sponge with water, hot as can be borne; heaped teaspoonful bicarbonate of soda in pint of water; weak lead lotion; apply zinc ointment or zinc dusting powder.

NOSE.

If foreign body in nose, cause patient to blow down or sneeze. Do not attempt to extract with any instrument.

POISONING.

Doctor at once, saying "case of poisoning": meanwhile, if

Stains on lips or mouth. Give *no* emetic.

If from acid, *e.g.* oil of vitriol, give chalk, whiting, magnesia in water, or, except for salts of lemon, bicarbonate of soda.

If from alkali, *e.g.* caustic soda, give weak vinegar or lemon juice.

If from carbolic acid or creosote give dessertspoonful of Epsom salts in water, and repeat ½ hour.

Give water freely in all these cases, also white of egg, gruel, milk, thin arrowroot or cornflour.

Other poisons. Give emetic, tablespoonful mustard or common salt in glass of water; tickle back of throat; large draughts tepid water; strong warm tea freely.

White of egg, gruel, etc., as above.

Patient drowsy—keep awake.

Patient unconscious—pint of warm (*not* hot) coffee by enema in bowel.

Breathing difficult—warm compress or sponge wrung out of hot water to throat; moisten air with steam from bronchitis kettle or ordinary kettle with long cardboard tube attached to spout; give ice to suck.

Breathing ceased—artificial respiration.

Abdominal pain—hot fomentations or poultices.

Faintness or collapse—weak spirits.

Preserve all the vomited matter for doctor's inspection.

SCALD.

See Burn.

SCRATCH.

Dab with tincture of iodine.

SICKNESS.

May be due to large number of causes. Obtain medical advice early.

For retching, large draughts of warm water may ease.

Vomiting—sips of hot water; iced champagne; mustard plaster on pit of stomach.

SPRAINS.

Simple Sprain—cold applications (*see* Bruise); put part in position of rest, lower limb elevated on pillow, upper in a sling. Do not prolong cold applications on old or debilitated people. Gentle massage as soon as acute symptoms subside, then gentle moving of joint by the nurse; elastic bandage.

Severe Sprain—difficult to exclude possibility of fracture or dislocation, consult doctor.

STING.

Extract sting, then apply weak solution of household ammonia or sal volatile; solution of bicarbonate of soda or permanganate of potash.

If necessary give weak spirits or one drachm of sal volatile in water.

Severe inflammation and general illness, see doctor at once.

STOMACH-ACHE.

Various remedies: (1) Half-teaspoonful bicarbonate of soda; (2) bismuth and soda; (3) peppermint water; (4) essence cinnamon, or spirit of camphor, 5 drops on sugar; (5) dilute spirits; (6) hot-water bag, hot fomentation or poultice.

In Infants. Sips of warm water; dill water; warm flannel to abdomen; warm feet. If not speedily relieved, consult doctor.

TOOTHACHE.

Clove oil or spirit of camphor on cotton wool into cavity of tooth.

Dry the gum and paint with tincture of iodine.

Hot-water bag or bread poultice to cheek. Aspirin.

To Destroy a Badly Injured Dog or Cat with a minimum of pain, the best plan is to strangle with a ligature round neck on principle of an improvised tourniquet—a loosely tied pocket handkerchief or string, tightened by twisting a short stick through it, will serve.

FIRST AID OUTFIT FOR THE HOME

A really adequate outfit should include the items specified below:

Boracic lint, ½ yard; oiled silk, ½ yard; absorbent cotton wool, ¼ lb.; two triangular bandages; finger bandage; clean scissors (*all these to be kept in their packages in tin box with tight lid*); tincture of iodine, 1 oz. (*a teaspoonful in 1 pint of water for antiseptic lotion*); boracic acid powder, 1 oz. (*to make eye lotion, etc.*); sal volatile, 1 oz.; boracic vaseline, 1 oz.; Friar's balsam, 1 oz.; permanganate of potash (*crystals or tablets*); Epsom salts, 1 oz.; tin of mustard; eye bath; Higginson's enema syringe.

FISSURE. In anatomy the term fissure is applied to many clefts or gaps separating the lobes or other subdivisions of an organ or separating one structure from another. There are many fissures in the brain. The term is also used for a narrow, elongated sore, and of this there are two common examples—fissure of the nipple and anal fissure. The former nearly always occurs during suckling and is largely due to failure to keep the nipple clean, though a hard, inelastic condition of the skin over the nipple doubtless contributes. To prevent this condition as far as possible, certain precautions should be observed during pregnancy (q.v.).

An anal fissure occurs at the back part of the lower end of the bowel, and there is generally an external pile, commonly referred to as a sentinel pile, at the lower end of the fissure. There is great pain when the bowels move and considerable straining.

The bowels should be kept easy by laxatives, and very soft paper or a soft rag should be used to cleanse the bowel after defaecation. It is a good thing also to wash the anal region thereafter by sitting in a basin of water. After drying, a little ointment of witch hazel may be applied, and should be put as far into the bowel as possible. Often it is necessary to resort to surgery. *See* Piles.

FISTULA. A Latin word meaning a pipe or tube, the term fistula is applied to an abnormal, narrow passage connecting some body cavity with the external surface of the skin or some such cavity with another one.

A fistula may be congenital, and is then due to a failure in the closure of tubes or gaps which exist in the foetus but which are normally obliterated. A fistula may be caused by a wound which involves a body cavity ; the wound does not heal because the contents of the cavity pass along the track, and so a fistula becomes established. A more frequent mode of origin, however, is the occurrence of an abscess which opens into a body cavity and also into another cavity or externally on the surface of the skin. Here, again, the passage of the contents of the cavity affected prevents healing. A common instance of this type is the anal fistula. If the fistula has lasted beyond a few weeks, cure without an operation is very unlikely. *See* Abscess ; Intestine ; Sinus.

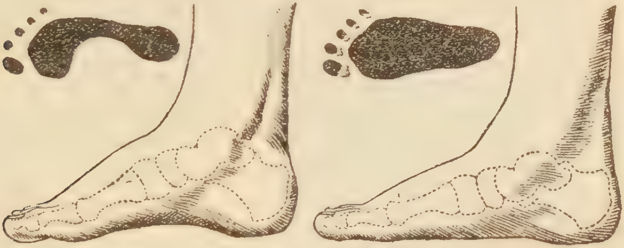
FIT. This term is usually meant to imply a seizure in which there are tumultuous spasmodic movements of many muscles, or, in other words, a convulsion. Of fits of this kind the most common are those that occur in epilepsy (q.v.), in eclampsia (q.v.), and infantile convulsions. The nervous mechanism of a child is relatively unstable, and fits may occur from slight causes and may not have much significance. The subject is dealt with under the heading Convulsions.

Fits may occur in an apoplectic seizure and in irritation of the brain from other causes, such as meningitis and encephalitis.

Anaemia of the brain is responsible for the fits occurring in Stokes-Adams disease, which is associated with an undue slowness of the pulse, and in other instances of slow pulse. Sometimes, and especially in young women, fits are due to hysteria.

The immediate treatment of an ordinary fit is described under the heading Epilepsy. *See* Bright's Disease ; Convulsions ; Eclampsia ; Epilepsy ; Fainting.

FLAT FOOT. The impress of the sole of the normal foot possesses a large depression, or bay, on the inner side, the reason for this being that the inner border of the foot, in consequence of its being arched from behind forwards, does not touch the ground. Dropping of this arch causes the condition known as flat foot, splay foot, or pes planus, and according to its degree the concavity in the normal impress becomes filled up and may entirely disappear.



FLAT FOOT. Left, normal bony arch with the imprint it makes ; right, position of bones and impression of sole in a case of flat foot

This sometimes comes on very quickly in those who are weakened by disease and have to do much standing, particularly if they are also engaged in weight lifting or carrying. Much more frequently, however, the arch of the foot sags gradually. This sagging, whether occurring quickly or slowly, is due to the structures which maintain the arch, and which are described under the heading Foot, becoming weakened and stretched. Flat foot causes soreness in the feet, which also are easily tired. The transverse arch also flattens, and from pressure on nerves in the sole of the foot there may be disabling seizures of pain, known as metatarsalgia, or Morton's disease.

Flat foot is often treated by putting a moulded pad or metal plate into the boot, so that the foot is supported in an arched position, but, except perhaps for old people, a better method is to exercise the muscles concerned in maintaining the arch in order to strengthen them, and raising the inside of the sole of the boot, putting more weight on the outer part of the sole of the foot.

Suitable exercises are as follows : (1) Bend and straighten the toes. (2) In a sitting position, and with the foot off the ground, twist the foot, so that its front part describes a circle in the air.

Each exercise should be repeated a number of times for several days, and then the following exercises are introduced: (3) With the feet parallel, rise on tiptoe, with the soles of the feet directed inwards as far as possible. (4) With the feet parallel and on their outer edge, walk forward for half a dozen paces.

The inner border of the boot should be straight, and the boot should be sufficiently roomy. The heel should be broad and the sole firm. A shoemaker should be directed to put a wedge on the inner side of the heel, so as to raise it ⅓ in. and also to prolong the heel forward on this side for ¾ in. On the sole, just below the ball of the great toe, another wedge should be put, raising this part also ⅓ in. *See* Ankle; Foot.

FLATULENCE. A disagreeable amount of air or other gases in the stomach or bowels is described as flatulence. Distension of the digestive tube may give rise to a painful sense of pressure and may even embarrass the action of the heart and of respiration. Excessive distension of the abdomen by gas is called meteorism.

The gas may be brought up from the stomach by eructations or belching, or be passed from the bowel, what is got rid of in these ways being described as flatus.

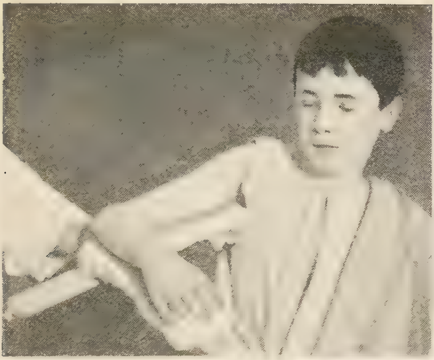
Although in certain instances flatulence is due to gases evolved by fermentation in the stomach, its usual cause is air, which is swallowed when eating and drinking. It is only when there is definite obstruction to the discharge of the contents of the stomach into the duodenum that there is likely to be sufficient fermentation to give rise to enough gas to cause flatulence.

Air may be swallowed incorporated with food or it may be gulped down. Sometimes hysterical people are troubled with belching lasting for hours, but if they are observed it will be noticed that they are simply gulping down air and bringing it up again. To lessen the air which may be mixed with food chewing should be done as far as possible with closed lips and should be done thoroughly.

To relieve flatulent distension remedies are taken to promote and at the same time regulate the movements of the walls of the stomach and bowels and are described as carminatives. Sips of hot water may relieve gastric flatulence, or diluted spirits, but most drugs which act as carminatives owe their virtue to a pungent volatile oil which they contain. To this class belong dill, anise, peppermint, ginger and others.

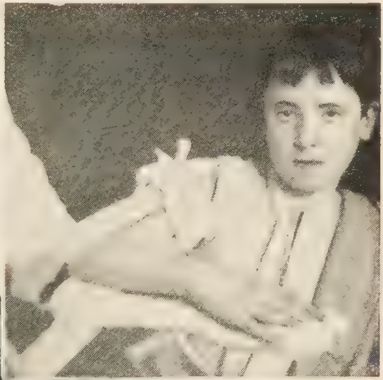
Intestinal flatulence is apt to follow certain classes of food, beans, for example. It largely depends on bacterial activity, and its occurrence may be prevented, or at any rate made less likely, by intestinal antiseptics, such as salol. It may be relieved by giving carminatives by the mouth or by incorporating something of the kind in an enema (q.v.). *See* Asafoetida; Carminative; Indigestion.

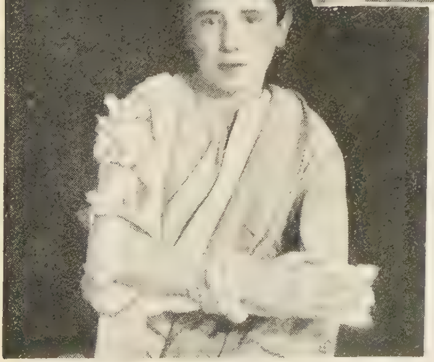
FLEA. Since the discovery of its connexion with the spread of bubonic plague the flea has assumed great importance in public



The rectangular splint is padded, special care being paid to the armpit, to prevent pressure on the nerve, and the limb laid on the splint

Next, a short splint is applied to the outer side of the arm and splints fixed by bandage above



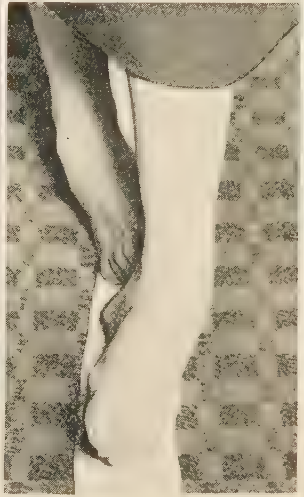


Finally, a bandage is applied just above the elbow and another fixes the forearm. Use a large sling to support the whole

TREATING A FRACTURE NEAR THE ELBOW

The condition of the feet can be improved by various simple measures, such as putting dusting boracic powder into shoes as a check to perspiration

Below. A corrective exercise for flat feet. Walk along a straight line (a bandage unrolled on the floor), treading on the edge of the foot. Perseverance with this exercise is necessary



A small pad of chiropodist's felt placed under the ball of the foot will give welcome support when tired by games

HOW TO KEEP THE FEET FIT FOR WORK AND PLAY

health administration. The flea specially concerned in carrying the germs of plague is a tropical species, which usually infests the black rat and might readily be brought to seaports, whence an epidemic might spread.

Fleas are blood-suckers and may transmit plague infection either by injecting the bacilli into the wound which they make or by depositing their excrement, which contains bacilli, after a meal taken from a victim of the disease, on the skin ; this may then be rubbed into the skin by the person scratching.

To prevent infestation with fleas it is necessary to destroy rats and mice, to supervise, and when necessary disinfect, the coat of dogs and cats, and to preserve strict cleanliness of the dwelling and of such places as dog kennels, stables, fowl-houses and outhouses of other kinds. *See* Bite ; Infectious Disease ; Plague ; Rats.

FLEXION. Bending a limb or part of a limb is described as flexion. Thus the fingers are flexed in making a fist. A muscle which produces this movement is called a flexor. *See* Extension.

FLIES. A great deal of the infection causing human sickness, to say nothing of domestic animals, is conveyed by flies of different kinds. The common house fly, which is distributed all over the world, may carry dysentery, cholera, typhoid fever, bacterial food poisoning, diphtheria, tuberculosis, ophthalmia, anthrax, and possibly leprosy, besides the eggs of different parasitic worms.

Flies are attracted by human excrement, and should this be infected it is likely to be taken up by the insect, either adhering to the hairs on its legs or actually in its stomach. When the fly then alights on food the infection is deposited there ; if it has been swallowed it is deposited by the fly voiding the contents of its bowel on the food, which it habitually does.

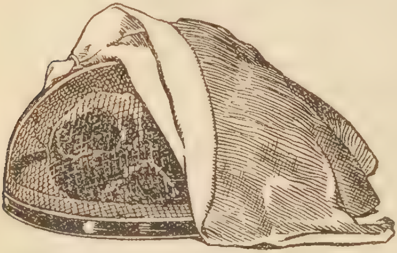
In hot countries the domestic fly breeds all the year round, but in colder countries only in the warmer weather. In Great Britain this means between June and October, with the greatest prevalence probably in August and September. In what condition the flies pass the winter is not known. A female fly lays from 120 to 150 eggs at a time, and in her lifetime from 600 to 900, and the interval between the egg stage and that of the adult female capable of breeding may be as short as three weeks.

The great bulk of the eggs are deposited in horse manure, but a certain number are deposited in human faeces and in garbage. Moisture and warmth make the substance, whatever it may be, more suitable for fly-breeding, nor will eggs be deposited in horse-manure unless it is fresh, say within 24 hours after it has been voided.

The eggs, which are about $\frac{1}{25}$ in. long, hatch out in from eight hours to three days into maggots or larvae which, in the course of about two to five days more, attain a length of almost ½ inch. These migrate during the dark from the substance in which they have developed and bury themselves in the earth, at depths varying up to several feet. Here they become quiescent and pass through the pupal or chrysalid stage, which lasts from three days to four or more weeks, when the fly hatches out and makes its way to the surface. In about two weeks or rather more it is mature and commences breeding. The longer periods noted are those occurring when the weather is cold.

In view of the disgusting and possibly dangerous contamination of food the destruction of flies is of the utmost importance. Horse-manure heaps should not be allowed near dwellings, and should be so dealt with as to discourage breeding. If horse manure is built in stacks about 5 or 6 feet high, each fresh addition being firmly compressed by beating it with the flat of a spade the fermentation which goes on in the centre of the stack raises the temperature to such a height that larvae are destroyed. The ground on which a stack is to be placed is prepared by spreading cresol or heavy oil on it and this should extend for at least 3 feet beyond the circumference of the stack. In dry weather the manure should be moistened to encourage fermentation. It should also be noted that if manure is thoroughly spread out, the lumps being broken up with a spade or rake, breeding is prevented if the manure becomes dry.

An earth closet or latrine is only permissible if it is flyproof, as larvae can burrow up through the soil from a considerable depth. Garbage should be burned in the kitchen fire as far as possible, and if put into a bin this should have a close and firm lid. Sprinkling the contents thoroughly with a solution of borax, ½ pound to 2 or 3 gallons, is an efficient deterrent, but it is necessary to point out that chloride of lime is useless for preventing the breeding of flies.



FLIES. Gauze meat-cover, which must be covered by a piece of closely woven muslin

There are numerous ways of destroying adult flies. Fly-papers may be used or metal rods made sticky with a mixture of 5 parts of castor oil and 8 parts of powdered resin, the resin being dissolved in the oil with the aid of heat. The rods are suspended from a string stretched across a room, but are only useful so long as they are sticky. Periodically they are passed through a flame and then recoated.

It is useful also to have plates standing about in the room, containing a little formalin solution, made up of two teaspoonsful of commercial formalin and lime-water to a pint, two heaped tablespoonsful of sugar being dissolved in this. A piece of bread is placed in the centre of each plate for flies to rest on. Fly traps of various kinds, such as the gauze globe and the Japanese mechanical trap, are also useful, the trapped flies being killed with boiling water or petrol vapour. Another method is to kill the flies with a gauze racquet or fly-swot. In addition to all this, it is still necessary to protect all foodstuffs in cupboards or on the table with gauze or muslin covers.

There are two other flies, the lesser housefly and the latrine fly, which may similarly contaminate food and convey infection. A certain number of flies, like the blue-bottle and the green-bottle, deposit their eggs in or on meat and are described as blow-flies. A gauze cover is not sufficient protection against the blue-bottle as the eggs are deposited on the gauze, whence they drop on to the meat. It is therefore necessary to have a piece of closely woven fabric either on the top of the gauze cover or over the meat.

These flies may also deposit their eggs on wounds or sores, which, if neglected, may become infested with maggots.

A blue-bottle may deposit its eggs in the nostrils of man or one of the lower animals, and other flies may also deposit eggs in this or some other of the natural cavities of the body. Infestation of the living body with fly-larvae or the symptoms caused by their presence is described as myiasis. *See* Food ; Formalin ; Infectious Disease ; Sandfly Fever.

FLOODING. A large discharge of blood from the vagina is commonly described as a flooding. Most frequently it comes from the womb, but its source may be in the vagina itself. It may occur in connexion with abortion, miscarriage or childbirth, and the most dangerous is that occurring after childbirth.

The immediate treatment of flooding is to keep the patient lying down with the head low and the legs raised. Douches of water at a temperature of 120° F. may be tried, and ergot is one of the drugs used in this emergency. *See* Abortion ; Change of Life ; Childbirth : Menstruation ; Pregnancy.

FLUSHING. *See* Blushing.

FOG. Air contains many minute floating particles of solid matter, and a fog or mist is caused by the condensation of the watery vapour of the air round such particles, owing to chilling of the air. In the atmosphere of towns it is a smoke-fog that forms from the presence of multitudes of particles of carbon in the air, including sulphur compounds which make the fog acid. Much smoke in the atmosphere shuts off a good deal of sunlight. Fogs have a chilling effect on the body, and, if smoke-fogs, cause irritation of the respiratory passages.

The prevention of smoke-fogs can only be achieved by lessening the smoke emitted from domestic and factory chimneys, by using anthracite, coke, and other kinds of smokeless fuel or, where raw coal is used, by improving the efficiency of grates and insisting on proper methods of stoking. *See* Air ; Damp.

FOMENTATION. A fomentation is applied to relieve pain and inflammation. The fabric generally used is either flannel or lint, and the piece selected should be large enough, when folded double, to cover the area to be treated. Sometimes more than two layers are used. The fabric is placed in a basin and boiling water poured over it until it is thoroughly soaked, when it is taken out and wrung almost dry.

The best way to do this is to put the fomentation between the folds of a roller-towel, or an ordinary long towel with its ends fastened together, through each end of which a long wooden stirrer, or something of the kind, is pushed and used to twist the end round, the twisting being performed in different directions at the two ends (*see* Plate 29).

The fomentation is then shaken out and applied, quickly but smoothly, and immediately covered with a piece of thin macintosh, jaconette or pegamoid, sufficiently large to overlap it by at least an inch all round. It is desirable then to cover with a thick layer of cotton wool and apply a broad roller bandage to keep the fomentation in position.

A fomentation applied in this way will retain its heat for a long time, but if the object is to relieve pain and greater heat is necessary, the fomentation should be renewed every twenty minutes or half an hour. The fomentation should be as hot as can be borne, but great care should be taken not to scald the patient. The reddening effect on the skin of a fomentation is increased by sprinkling a large teaspoonful of oil of turpentine over it just before it is applied. *See* Dressing; Poultice.

FOOD FOR THE AVERAGE HOUSEHOLD

Values and Digestibility of Various Kinds Explained

The following article will prove invaluable in helping the housewife to choose the most nourishing foods for her family. How food should be stored, and how to avoid food poisoning are important matters, and are dealt with in the following pages

The principles regulating the proper rationing of food are discussed under the heading of Diet. The claims of the palate must give way to soundness in dieting, and difficulty, on the score of expense, in providing a proper diet can be overcome quite well by a judicious choice of food-stuffs, as many of the cheap foods are intrinsically as valuable as the more expensive. Skilful cookery can do much to give attractiveness to food-stuffs which are not in themselves very inviting, and this is perhaps the most important factor in solving the dietetic problems of households with very limited resources.

Chilled and frozen meat are quite as nutritious as fresh meat, and the inferior cuts of any meat are from this point of view quite as good as the better. Mutton is more digestible than beef and beef than veal. Pork, because of its large content of fat, is difficult to digest. Tripe and sweetbreads are easily digested.

Rabbits are in season from September to February; a young animal is distinguished by its smooth, sharp claws and soft ears. The meat is easily digested.

In choosing a fowl an old one will be recognized by its stiff, horny feet, long spurs and dark-coloured thighs. The skin of a fowl should not be discoloured and the flesh should be firm. The meat of duck or grouse contains a considerable amount of fat and is correspondingly harder to digest. The breast of a chicken is the most easily digested kind of meat.

Only fresh fish should be accepted; a fresh fish is stiff, the eyes are prominent and bright and the gills are bright red. Salmon and eel contain a considerable proportion of fat, and so require good digestive powers, and invalids may find that even herring disagree. Owing to their cheapness, herring are, however, one of the most valuable foods. Oysters, if raw, are very easily digested, but they do not contain much nourishment. Crab and lobster are difficult to digest. Among fish in season all the year round are brill, lobster, plaice and sole. Oysters are out of season during the four months of the year whose names do not include an R. Mussels are out of season from May till November inclusive, and herring during the first four months of the year.

"Wholemeal" bread contains all parts of the grain, including the bran or grain covering. In "standard" bread part of the bran has been removed, and also the germ of the grain. The loss of the bran and the germ implies the loss of vitamins and also of the organic phosphorous compounds which these parts of the grain contain. This may not be of much consequence where a mixed diet is taken, but in children who are fed almost entirely on bread it is a factor in causing rickets.

White bread is more digestible than the others and is to be preferred when there is any difficulty in digesting the latter; but in this case milk, eggs or other foodstuffs are imperative for the sake of the vitamins.

Macaroni and vermicelli are preparations of wheat flour and are rich in gluten. Barley has a composition like that of wheat, but it does not form gluten. It is a good food, though barley cakes are less palatable than, and not as easily digested as, bread. To make pearl barley the grains are deprived of the husk, rounded and polished. Barley meal consists of the whole grain ground; in Scotch, mulled or pot barley, the grains are husked and roughly ground; patent barley is merely flour formed from pearl barley. Rye makes a dark, somewhat heavy and acid loaf, which is not so easily digested as wheat bread but otherwise very wholesome.

Oatmeal contains relatively large amounts of protein and fat and, apart from greater difficulty of digestion, is a better food than white bread. It might with advantage form a part of every dietary. Maize resembles oats in composition but is rather harsh in flavour. From it cornflour and hominy are prepared.

CONSTITUENTS OF SOME COMMON ARTICLES OF FOOD

Food-stuff	Grammes per ounce			Calories per ounce
	Protein	Carbo-hydrate	Fat	
Milk, fresh, average	1.0	1.5	1.0	20
Butter	0	0	25,0	225
Cheese, Cheddar	12.6	0	6.8	115
,, American	9.6	0	9.3	126
,, Stilton	6.9	0.6	10.6	130
,, Cream	5.2	0	7.0	86
,, Camembert	5.3	0.9	6.0	80
,, Skim-milk	9.2	1.9	2.4	69
Margarine	0.2	0	23.2	216
Eggs	3.0	0	3.0	40
Beef, fresh, lean	6.0	0	3.0	51
,, corned	6.6	0	4.0	64
Veal, loin	5.6	0	2.8	49
Mutton, shoulder	4.1	0	5.5	68
Lamb	5.2	0	4.7	65
Pork, fresh side	2.5	0	14.9	149
Bacon	5.0	0	15.0	160
Chicken	6.0	0	2.2	45
Cod	4.7	0	0	19
Eel	5.3	0	2.6	46
Herring, fresh	5.6	0	2.0	41
,, smoked	10.5	0	4.5	85
Haddock	4.9	0	0	20
Mackerel	5.3	0	2.0	40
Salmon	6.2	0	3.6	59
Whiting	4.8	0	0	20
Flour, family grade	2.3	20.8	0.3	88
Bread, white	2.0	14.5	0.4	76
,, brown	1.4	13.0	0.4	63
Biscuit	4.4	20.8	0.3	106
Oatmeal	4.6	18.0	2.0	111
Rice	2.0	22.5	0.1	101
Peas, fresh	1.5	4.7	0.1	26
,, dried	4.9	17.8	0.2	95
Jam or marmalade	0	16.6	0	68
Sugar refined	0	28.3	0	116
Vegetables, fruit, raw A	0.5	1.0	0	6
,, ,, ,, B	0.4	2.0	0	10
,, ,, ,, C	0.3	3.0	0	14
,, ,, ,, D	0.1	4.0	0	17
,, ,, ,, E	0.3	6.0	0	26

Rice is deficient in protein, fat and salts, and therefore is mainly a starchy food. Polishing the rice deprives it of vitamin and a diet of polished rice causes beri-beri.

Arrowroot, tapioca and sago consist of starch simply. There are various kinds of arrowroot on the market, Bermudan arrowroot being the best. Tapioca is got from cassava root, sago from the sago palm. When these are used as milk puddings, protein and fat are supplied by the milk. The pulses, namely peas, beans and lentils, are rich in protein, but peas and beans are rather difficult of digestion and much of the protein is not assimilated.

Potatoes contain a large proportion of starch with a little protein. Experimentally, vigorous health has been maintained on a diet of potatoes and vegetable margarine with a flavouring of onion. But the water in which the potatoes were boiled was also taken, the potatoes being very thinly peeled before cooking. The water contains valuable salts and vitamins taken out of the potatoes. The loss of these salts can be prevented, or lessened, by boiling potatoes in their skins.

For convenience vegetables and fruits are grouped in five classes according to their content of carbohydrate, which is their principal constituent as regards caloric value. Their vitamins, salts and acids are of great importance, in many cases of most importance. The carbohydrate content of each group is shown in the table of foods in page 358. The groups are as follows: A. Cabbage, lettuce, cauliflower, sprouts, spinach, tomatoes, watercress and radishes. B. French beans, onions, carrots, turnip and beets. C. Strawberries, gooseberries, oranges, peaches pineapples and melons. D. Pears, apples, currants, raspberries, cherries, apricots, peas, parsnips and artichokes. E. Bananas, plums, prunes and potatoes. By reference to this table and to the particulars given under the heading Diet as to the relative proportions of proteins, carbohydrates and fats in a diet, and the number of calories needed by various people, it should be possible to construct correct dietaries.

In the storage of food cleanliness and coolness are essential. On no account should milk, fish, meat or similar food-stuffs be kept on the floor of the larder, and they should always be covered or screened to protect them from dust and from the visits of flies. A gauze screen is not sufficient protection against the blue-bottle as the female deposits her eggs on the gauze and they drop down on to the meat; a piece of muslin should be placed over the meat or on the top of the gauze cover. Weighted gauze covers should be put over jugs or other receptacles containing milk, jam, etc. Root and green vegetables should be stored separately.

Coolness may be secured by free ventilation of the larder through a gauze-screened window; by having a moistened canvas cover over a food container; by placing ice on fish, meat, etc., or by placing food in an ice-chest; the last would be of inestimable value in hot weather.

Much of the food used nowadays is canned or bottled and a considerable amount of bottling is done in the home. To make such food keep it is subjected to heat in the tin, in the lid of which an opening is left to allow the escape of vapour. This opening is then soldered up, and the contraction which occurs when the tin and its contents cool usually causes the ends of the tin to bulge inwards. If the end of a tin bulges outwards it should be rejected, as the bulging is due to gases formed by putrefaction. Such a tin is said to be blown.

Unscrupulous traders may perforate the tin, allowing the escape of the gases, then reheat and reseal. The presence of two soldered openings should therefore be viewed with suspicion. Bottled fruit and vegetables are treated similarly. Jam is usually covered after it is cold, and the surface may be sprinkled with some chemical preservative ; indeed, something of this kind may be found in any kind of preserved food. When a tin has been opened the food should be used at once ; it is dangerous to allow it to stand in the tin or even, having once heated the food emptied from the tin, to allow it to stand.

The use of chemical preservatives for food can hardly be dispensed with, as so much food is imported and both this and home-produced food require to be stored, sometimes for considerable periods. Some chemicals used for preserving are harmful if taken in the amounts which might well be ingested in the course of ordinary diets containing a fair proportion of preserved food. Boracic acid is an example. The only preservatives now allowed are sulphurous acid and benzoic acid.

Poisoning by Food. Food poisoning may be due to metallic poisons, copper, tin, or lead, from containers or cooking utensils, but is relatively infrequent. Strict care, however, is necessary to keep such utensils clean and not to allow foods containing acids, fatty or otherwise, to remain long in a copper utensil.

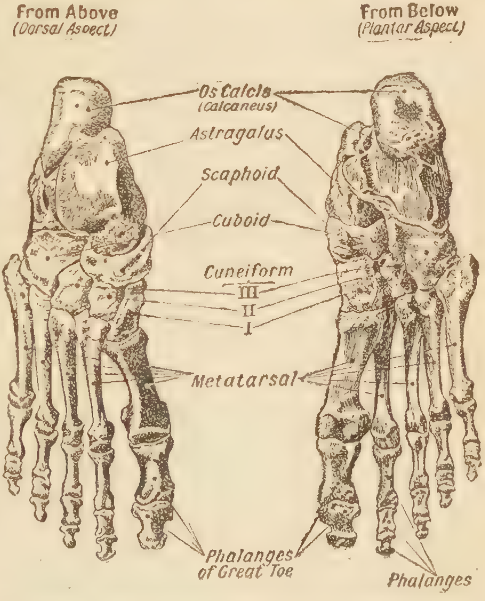
Most cases of food poisoning are due to the activities of what are called the salmonella group of bacilli. The symptoms may be caused by the poisons produced by the bacilli, poisons which remain active even if the food is raised above the boiling point of water ; or by the living bacilli themselves. These bacteria may be present in either canned or fresh food.

Symptoms due to the accumulated poisonous products of the bacilli begin shortly after the food is consumed, and suddenly. There is vomiting, diarrhoea, abdominal pain, cramps in the limbs and some fever. This type of poisoning is most frequent after taking tinned foods. When the living bacilli are swallowed, symptoms do not begin till about twelve hours or longer after the infected food has been taken. Though similar to those of the other type they are less abrupt in their onset, less severe as a rule, but more protracted.

Vomiting and diarrhoea are usually sufficiently severe to clear the bowel, but it will be useful to aid cleansing of the stomach by giving large draughts of tepid water and, if the bowels are not acting freely, a dose of salts or of castor oil. The patient must be kept lying down and be kept warm; stimulants also may be needed. Pain and cramps should be treated by hot applications.

Another kind of bacterial food poisoning is known as botulism (q.v.). Formerly much importance was attributed to ptomaines, alkaloidal products of putrefactive organisms, but it is now clear that such poisons are destroyed in the stomach and are extremely unlikely to give rise to symptoms.

FOOT. There are three regions in the foot, the tarsus, containing seven bones, the metatarsus containing five, and the toes containing fourteen—that is, three for each toe except the big toe which has only two. The bones of the toes are called phalanges (singular phalanx). The foot is jointed to the leg bones by the astragalus which is perched on the top of the os calcis, calcaneum, or heel bone as it is variously called. These two bones belong to the tarsus, and the others are the scaphoid, which articulates with the astragalus, three cuneiform or wedge-shaped bones, which articulate with the scaphoid, and the cuboid bone which articulates with the forward end of the os calcis.



FOOT. Bones of the upper and lower surfaces

A glance at the normal foot will show that it has two arches, an antero-posterior, that is from front to back, and a transverse, or from side to side. What might be called the keystone of the antero-posterior arch is represented by the head of the astragalus, which rests on a ligament, joining the os calcis and the scaphoid bone, and known as the inferior calcaneo-scaphoid ligament. This structure is very important in maintaining the integrity of the arch. Relaxation of the ligament is followed by collapse of the arch and flat foot. An exaggeration of the antero-posterior arch occurs in the deformity known as pes cavus, or claw foot, in which there is also the condition of hammer toes.

The transverse arch of the foot is best seen about the middle, that is, at the cuneiform bones, and contributes towards the elasticity of the forward part of the foot. If when jumping, one lands on the fore part of the foot, there is much less shock transmitted up the legs than when one lands on the heels.

The lower surface of the foot is called the sole or plantar aspect, and the upper surface, the dorsum or dorsal aspect ; the upper part of this is commonly referred to as the instep.

The skin of the sole is very thick as compared with that of the dorsum, and there is the further difference that in the sole the structures between the skin and the bones are densely packed together, while beneath the skin of the dorsum there is much loose tissue. So, while inflammation in the dorsum of the foot may cause very considerable swelling, there is not, as a rule, very much swelling in the sole, but, on the other hand, this inability to swell results in very severe pain.

Of the muscles which move the foot and toes some are situated in the leg, and prolonged into the foot by tendons, while others are in the foot itself, most of them being in the sole.

Blood is supplied to the foot by the anterior and posterior tibial arteries. Bleeding from a wound in the sole is best arrested by pressure on the posterior tibial artery (*see* Plate 11). The superficial veins of the foot run into the internal saphenous vein mostly, but some are drained by the external saphenous vein.

Several nerves run into the foot. The posterior tibial, which is found on the inside of the ankle with the artery of the same name, on passing into the sole divides into the internal and external plantar. The digital branches of these, passing to the toes, are sometimes compressed at the heads of the metatarsal bones, giving rise to severe pain of a neuralgic character. This constitutes Morton's disease, or metatarsalgia, and is liable to affect those who have to stand much. The pain can often be relieved by compressing the foot from side to side, that is, restoring the transverse arch. A bar fixed across the outside of the sole of the foot behind the heads of the metatarsal bones, by taking the pressure off the nerves, may prevent pain.

CARE OF THE FEET. Poor circulation is responsible for much foot trouble and is a cause of chilblains, corns and callosities. When there is a tendency towards these, tight shoes should never be worn and the general health and circulation should be improved by a well balanced diet and by taking more exercise. To induce circulation locally and to strengthen the feet the exercises given under the heading Ankle are beneficial, also skipping, dancing, especially jig and reel steps.

Callous places on heels or balls of the toes may be rubbed with a piece of fine pumice stone and should be treated at night with ointment composed of equal parts of boracic vaseline and zinc ointment, massaging it well into the feet.

Scrupulous cleanliness is essential. Scrub the feet daily with a nailbrush to stimulate the circulation, using a good soap and warm water. Dry them very carefully, especially between the toes. At night massage with vaseline or other ointment; in the morning dust them with borated talcum powder. The stockings should be changed daily and the shoes aired after wearing. Rubbing methylated spirit into the feet after washing will prevent tenderness of skin. Perspiring feet should be bathed in warm water to which eau-de-Cologne has been added, and sponged occasionally with a diluted antiseptic liquid, which should be allowed to dry on, afterwards powdering the feet.

Swelling of the feet may be due to a variety of causes, which will require medical attention; relief, however, may be obtained by soaking them in a footbath containing very hot water to which a tablespoonful of bicarbonate of soda has been added.

A weekly pedicure consists in loosening the softened cuticle after bathing, pressing it down with an orange-stick round the base of the nails. Cut the latter straight across, and not in an oval shape, to prevent any danger of ingrowing. Smooth the edges afterwards with an emery board and polish with a manicure pad and a little nail powder. *See* Ankle; Blister; Chilblain; Claw Foot; Club Foot; Corn; Flat Foot; Fungus Foot; Hallux Valgus; Hammer Toe; Toe.

FOOT DROP. If the foot cannot be raised to make at least a right angle at the front of the ankle a condition of foot drop exists. This may be due to disease about the ankle or to shortening of muscles of the back of the leg, and the foot may be fixed, more or less, in the bad position; or it may be due to loss of power in the muscles on the front of the leg, that is, paralytic foot drop.

It may be possible by operating on the ankle joint or dividing the Achilles tendon to put the foot at right angles with the leg, or in a paralytic case to do this by shortening the tendons on the front of the ankle so as to anchor the foot. In a paralytic case, when recovery of power in the muscles is still possible, it is highly important to prevent the foot from dropping and the patient should wear an apparatus to prevent this when he is up and about and should also wear a right-angle splint, sometimes referred to as a bed-shoe, when in bed.

When the deformity cannot be remedied otherwise, a patient with a foot drop should wear a spring on the front of the leg to keep the foot up. *See* Ankle.

FORMALIN. By passing the vapour of methyl alcohol over red hot copper a colourless gas with an acrid smell is got, which is known as formaldehyde, or formic aldehyde. Formalin, or formol, is a 40 per cent solution of this gas in water. Both solution and gas are strong disinfectants and deodorants. From the solution by proper dilution are made lotions for wounds, injections, gargles and sprays. As a spray and in other ways it is useful for destroying flies (q.v.). A 1 per cent. solution of formalin is suitable as a general antiseptic.

Formaldehyde is much used for disinfecting rooms which have been occupied by persons suffering from infectious diseases. *See* Antiseptic ; Disinfection.

FORMIC ACID. A colourless liquid with a pungent, irritating smell, formic acid is contained in the liquid injected by ants and bees when biting and stinging. It is the cause of the pain and swelling which follow. Formic acid is also generally stated to be present in the ordinary stinging nettle, though this has been queried. Rheumatic joints are sometimes treated by causing bees to sting the skin over them, and dilute solutions of formic acid have been injected hypodermically in order to serve the same purpose.

FORMICATION. The abnormal sensation, or paraesthesia, resembling that caused by ants crawling over the skin, is described as formication. This may occur, for example, in peripheral neuritis, an inflammation of nerves, caused by alcohol and other poisons. *See* Sensation.

FRACTURE: SIMPLE AND COMPOUND

Practical Instructions for an Everyday Mishap

Since fracture of a bone is an accident that may befall anyone, a general understanding of the nature of such injuries and their possible consequences is highly desirable. See Accident ; Ankle ; Bandage ; Bone ; Splint ; etc.

A bone may be broken or fractured by external violence, and this may be direct or indirect, the former as when a wheel passes over the leg and breaks it, the latter as when the wheel passes over the chest and breaks one or more ribs. In the latter instance the break does not occur at the point where violence is applied, but the rib is bent and snaps at its weakest point.

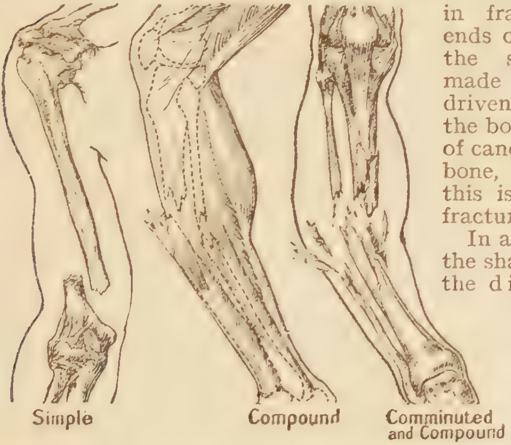
Various circumstances predispose a bone to fracture. Thus the bones of an aged person break easily because the earthy constituents have increased very largely, with a corresponding diminution of the tough cartilaginous, or gristly, constituents. Again, some people are born with a weakness in their bones, a condition known as fragilitas ossium, and such during a lifetime may sustain many fractures. Rickets and other diseases weaken the bones. Inflammation, and especially suppuration in a bone, or the presence of a tumour, may so weaken a bone, that what is called spontaneous fracture occurs, merely from the ordinary use of the limb and without any violence.

The damage in a fracture may be limited to the bone ; such is called a simple fracture. If the skin is divided, either by the broken bone projecting through it or by a missile, the fracture is said to be compound, and is more serious than a simple one in that there is an opportunity for a free loss of blood, but more so, perhaps, because disease organisms may be admitted to the site of fracture. When a fracture is accompanied by tearing of the main blood vessels, or nerves, or of muscles or internal organs, it is said to be a complicated one.

A comminuted fracture is one in which there is splintering of the bone at the site of the fracture, and when a bone is broken in several places, or several bones are broken, the fracture is multiple. In young persons the bones are relatively tough, and, as a rule, a fracture is not complete, but the bone is partly bent and partly broken. This is what usually occurs when a fresh twig is broken, and, therefore this form of fracture is known as a greenstick fracture.

It sometimes happens in fractures near the ends of long bones that the shaft, which is made of dense bone, is driven into the end of the bone, which is made of cancellous, or spongy, bone, and fixed there; this is an impacted fracture.

In a fracture through the shaft of a long bone, the direction of the break is generally oblique, an important fact because the fragments can readily slip past each other and be displaced by the violence breaking the bone or by the pull of the muscles, and, further, because each fragment is furnished with a sharp point or edge which may easily damage the soft tissues. The direction may be transverse, however, or, particularly when the fracture is caused by a missile, say a bullet, or by a stabbing instrument, it may be longitudinal, or vertical; near a joint it is not uncommon for these to be combined, so that a T-shaped fracture results. If the violence has been partly of a twisting character, the direction of the break may be a spiral one.

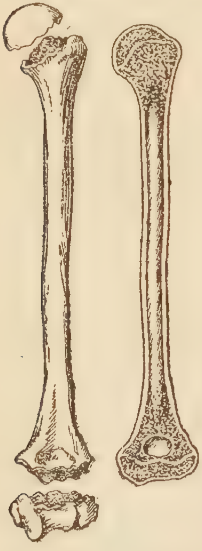


FRACTURE. Three types of this bone injury; left, simple fracture of the humerus; centre, skin torn by fractured leg bones; right, splintered bones in leg fracture

In young persons whose bones are still growing an accident resembling a fracture may occur, namely, separation at the epiphyseal cartilage. This is a plate uniting the end of a bone to the shaft, and by which the bone grows in length. Either by hard pulling on the bone, as for example when a heavy child is lifted by the hands, or otherwise, the end of the bone is detached from the shaft. Unless the accident is properly treated, the growth of the bone may be interfered with seriously.

A person who sustains a fracture may be conscious of the snap. There is likely to be considerable pain and more or less shock. If it is a limb bone, there is loss of the use of the limb if the main bone is broken, but if, say, the fibula alone is broken, a person may stand fairly well. When only one bone of the arm or leg is broken, there may be little displacement of the fragments, because the other bone acts as a splint.

There is likely to be considerable discoloration of the skin over a fracture, and the same succession of colours as is observed after a bruise. A broken bone is mended by a copious formation of new cells, forming a mass known as callus, in which the ends of the fragments become embedded; the amount of callus is increased by mal-position of the fragments and by movement; and, on the other hand, when the nutrition of the parts is poor, there may be insufficient callus to effect union. Lime salts are deposited in the callus or in fibrous tissue into which this has been converted, and later there is a development of true bone. Union of a fracture is usually complete in from four to eight weeks, according to the size of the bone involved.


FRACTURE. Separation of epiphysis. Right, section showing epiphyseal line

In the first-aid treatment of fractures the first thing to be attended to may be bleeding, and there is always a certain degree of shock. If the fracture is a compound one, and there is more than slight bleeding, or, if from the rapid and severe swelling of the limb it may be apprehended that serious bleeding is taking place within the limb, a tourniquet (q.v.) ought to be applied. Shock is treated by warmth; stimulants may be given, but only in the event of there being little bleeding. If the fracture is compound and a piece of bone is projecting, this may be daubed with tincture of iodine, and if there is soiling by earth or anything else, as much as possible of the dirt should be removed by light rubbing with a clean rag, after which tincture of iodine should be used freely. If a doctor can be on the spot quickly, however, the wound should be covered with a clean rag and the cleaning left for him to do.

Before moving a patient with a broken limb, the fracture must be reduced, or set, that is, the ends of the fragments should be brought into their natural position as far as possible, and the limb should then be splinted to prevent the fragments from moving. Reduction is accomplished by one person pulling on the limb (extension) while another fixes the upper end of the limb or the trunk (counter extension). Thus, for a fractured thigh, someone would pull at the ankle while another fixes the trunk by grasping below the armpits. In extension, the pull must be steady and the limb should be held in a correct position, the foot, for example, in fractures of the lower extremity, being at right angles to the leg, and the toes turned slightly outwards.

A splint may consist of anything which is sufficiently rigid and light—a broom handle, umbrellas, walking sticks, battens, even folded cardboard or newspapers. It should be long enough to prevent movement at the joint above and below the fracture, and, before being applied, should be well padded. Extra padding is used over bone prominences, as at the ankle, the haunch, or the elbow. Splints are placed both on the inner and the outer side of the limb and are fixed with bandages, preferably folded triangular bandages or large handkerchiefs. These should be knotted over the splint on the outer side of the limb.

A splint should be broad enough to prevent the bandages from cutting into the flesh, or, if narrow, like a broom handle, additional small splints should be placed round the limb. When there is difficulty in obtaining splints, an upper limb may be fixed against the trunk, or the lower limbs can be tied together until splints are available, but a lower limb must be made rigid by splinting before a patient is lifted.

While splinting must be firm enough to control the fracture it must not be tight enough to interfere with the circulation in the limb. To test this, when the splints are applied, the finger or toe nails may be observed; pressure on the nail should cause it to whiten, but the pink tint should return as soon as pressure is discontinued. Over-tightness of splints is responsible for Volkmann's contracture in the forearm in which there is inability to straighten out the fingers unless the wrist is bent.

A person with a broken lower limb or spine should be carried on a rigid stretcher and be treated on a fracture bed, that is, one which has been made rigid by putting boards over the framework of the bed, beneath the mattress.

If at all possible, the fracture should be examined with X-rays to ascertain its nature and ensure its correct reduction. Varieties of splint are dealt with under that heading and an extension apparatus is illustrated in Plate 52. Sometimes a plaster of Paris bandage is put on a limb, and when dry, or in a few days, it is divided on each side of the limb so that a moulded splint of two pieces is obtained which can be taken off and reapplied.

Fractures at or near the neck of the femur or the neck of the humerus are put up in an abducted position as a rule, that is, the lower end of the limb is drawn away from the middle line of the body. The arm may be placed on a triangular frame, and may be put as high as at a right angle with the body.

After a few days a limb is taken from the splints daily and the joints are gently moved by the doctor; very soon, too, the patient may be asked to do gentle movements himself. Massage is done regularly, and perhaps electrical treatment is used also, these measures being useful for promoting absorption of swelling and for maintaining the bulk and tone of the muscles. Before much weight is put on a fractured lower limb the patient should get about for some days on a crutch and should use a stick for some time afterwards.

An old person who has fractured the neck of the femur and is treated by confinement to bed runs a considerable risk of dying. When possible, therefore, the injured limb is fixed in a Thomas's splint, the other foot raised on a patten and the patient provided with crutches and allowed to get about; the patten is sufficiently high to keep the lower end of the splint off the ground. By the use of special splints other fractures are sometimes treated by this so-called ambulatory method.

The first aid treatment of various fractures may be summarised as follows:

Skull. Carry and lay in bed with the head raised; warmth to the feet; cold, preferably iced, applications to the head. The room should be darkened and kept quiet. Do not give alcoholic stimulants.

Nose. Put cold applications on the bridge of the nose; the patient should be in a semi-recumbent position. If there is free bleeding, gently plug the nostril affected.

Lower Jaw. Put the centre of a narrow-fold bandage below the jaw, carry the ends to the top of the head and tie in front of the vertex, or most prominent part. Put the centre of another narrow-fold bandage over the front of the lower jaw, carry the ends to the back of the neck and tie; now tie each of these ends to the corresponding end of the other bandage.

Spine. Wait for a doctor, if possible, before lifting. Procure a door or something similar, or place a board beneath the canvas of a stretcher, resting on the traverses so that the stretcher will not sag. For lifting, gently drag a thick sheet or blanket beneath the patient. Four persons stand astride over the patient and, grasping the sheet close to his body, raise him together, someone giving the command, avoiding any bending of the spine; while another person pushes the stretcher through between the legs of the bearers. The patient is now lowered on to the stretcher, where he lies flat. The same precautions are necessary in removing him from the stretcher on to a bed, which should also be rigid. The patient must be kept warm and should be given stimulants in small doses.

Collar Bone. A large pad is put in the armpit. One end of a triangular bandage is put over the sound shoulder, the point of the bandage being also towards the sound side. The injured limb is placed over the cloth, the fingers directed towards the sound shoulder. The other end is then brought over the lower third of the arm, passed below the armpit and knotted to the other end at the back. The point of the bandage is folded in and the loose carried over the hand and pinned off. A narrow-fold bandage is placed with its centre a little above the elbow and the ends are carried round the body and tied. Another method of bandaging is shown in Plate 16.

Shoulder Blade. Support the arm in a greater arm-sling and fix it by a bandage passing round the limb and the body.

Humerus. Select two splints, one to reach from the shoulder and the other from the armpit to below the elbow; pad well, including the upper end of the latter, which goes on the inner side of the arm, the other being on the outer side. Fix the splints by a narrow-fold bandage above the fracture and another below it. Support at the wrist by a lesser arm sling.

If the fracture is near the elbow joint, take a splint reaching from the armpit to the elbow and another from the elbow to the tips of the fingers. Tie or otherwise fix these at one end so as to form an L-shaped splint. This is applied to the inner side of the limb, fixed by a bandage round the arm, and another round the forearm. Support the limb by a greater arm sling (*see* Plate 31.).

Bones of the Forearm. Apply the same splint as above, the forearm being placed with the thumb upwards, and put a short splint on the back of the forearm. Fix by bandages above and below the fracture. Use a greater arm sling. It is an advantage, however, to put up the forearm with the palm of the hand facing upwards, and this should be done if an L-shaped splint can be got ready, one limb of which is applied to the back of the arm and the other to the back of the forearm. A short splint is placed on the front of the forearm. Both splints must be well padded.

Bones of the Hand. Splint as for the forearm, the first method above described.

Rib. Put a pillow-slip round the chest and fix with pins or apply bandages as described in page 88. The pressure should be sufficient to lessen the breathing movements, but should not cause pain.

Pelvis. Put a pillow-slip or two broad-fold bandages round the pelvis. Carry on a rigid stretcher and lay on a fracture-bed.

Thigh Bone. The splint for the outer side of the limb should reach from the armpit to below the sole of the foot and that for the inner side from the crutch to below the knee; frequently a short splint is also placed on the front of the thigh. The upper ends of the two former must be well padded. A long broom makes a good outer splint (*see* Plate 30).

The outer splint is first attached to the body by broad-fold bandages, one round the chest below the armpits, and another round the haunches. The other splints are then applied and fixed with one bandage above the fracture and another below it. The long splint is now fixed to the leg by a bandage just below the knee and another at the ankle; finally, the two legs are tied together by placing the middle of a narrow-fold bandage at the back of the legs just above the ankles, bringing the ends round, crossing over the insteps and tying opposite the space between the soles of the feet.

When applying a bandage to the limb, it should be folded double and a short splint put into the loop, which is then pushed beneath the limb, when one end of the loop is caught and drawn forward. This obviates any movement of the limb. The lower end of the long splint should be raised off the ground by a block several inches high, and this should be used also on the stretcher and when the patient is put to bed. Later, the limb is slung, as a rule.

Knee-cap. A splint reaching from the buttock to below the heel is placed beneath the limb. The centre of a narrow-fold sling is placed above the upper fragment, and the ends carried round beneath the splint, crossed, brought forward and tied below the knee; this is to drag the upper fragment down. The centre of another narrow-fold is applied below the lower fragment, and the ends of this are tied above the knee; this is to drag the lower fragment up. The splint is further fixed by a bandage round the thigh and another at the ankle, when the two legs are tied together, the feet being raised.

Leg Bones. An outer and an inner splint are required, each reaching from above the knee to below the sole, and fixed by a bandage above the side of fracture and another below it, or if the fracture is at the ankle, by two above and one below. The legs are tied together and the feet raised. Care in handling is required to prevent perforation of the skin by a fragment of the shin bone.

Foot Bones. Splints are applied as above.

In fractures of the lower extremity care should be taken to keep the foot at right angles to the leg.

FRECKLES. The small, light to dark brown areas of discoloration on the skin, which are known as freckles, are caused by the chemical rays of sunlight, and only exposed parts of the skin are affected. Freckles are more prone to appear in brunettes and in persons with red hair and a delicate skin. Those who are subject to them are not bronzed by exposure to sunlight.

Preventive measures consist in avoiding direct exposure to the sun's rays as far as possible, by using a broad hat, a parasol, a red or brown veil, or a calamine or skin-coloured dusting powder.

The following remedy is for outward application only, to be applied at night.

Ammoniated mercury	1 part
Bismuth subnitrate	1 part
Olive oil	6 parts
Glycerin	8 parts
Soft paraffin	8 parts

FRIAR'S BALSAM. *See* Balsam.

FRIEDREICH'S ATAXIA. An uncommon nervous disease, Friedreich's ataxia tends to affect several members of a family. It begins in early life and in the legs, the gait becoming like that of a drunken man. Soon the feet become deformed, the child walking with the heel raised and on the outer side of the foot, which also takes on the appearance described under the heading Claw Foot. The speech is syllabic or scanning, the eyeballs oscillate to and fro, and the knee-jerks (q.v.) are lost. The arms also become affected and the legs become paralysed. Lateral curvature of the spine is common. Death occurs from pneumonia or some other intercurrent disease.

The disease is caused by imperfect development of tracts in the spinal cord, and this cannot be remedied. An attempt should be made, however, to prevent contracture, or tightening up, of muscles, as far as possible. *See* Ataxia ; Nervous System.

FRONTAL BONE. The cavity of the cranium, or brain-pan, is closed in anteriorly by the frontal bone, which also helps to form the floor of the cavity. *See* Skull.

FROST BITE. A severe degree of cold may arrest the circulation in certain parts of the body, those most often affected being the toes, the fingers, the edge of the ear and the tip of the nose. Tight, ill-fitting gloves and boots increase the risk to the fingers and toes respectively. The part becomes waxy and dead-looking but there is no pain, so that the person may be unaware of what has happened. If the part recovers from the chilling it becomes very inflamed ; blisters may form on the surface.

The old-established remedy in cold countries is to rub the part with snow, as it is considered to be unwise to warm it too quickly. So in treating frost bite it is customary to bathe with cold water and employ moderate friction. In the state of congestion, the plan is to treat the part with hot and cold water alternately, and then massage towards the heart, in order to lessen congestion as far as possible. For the same reason the part, if a limb, should be kept in an elevated position. *See* Chilblain ; Gangrene.

FUCUS VESICULOSUS. Popularly known as bladder or sea wrack, fucus vesiculosus contains considerable quantities of iodine, bromine and chlorine in the form of salts. It is used in the treatment of obesity and other disorders. *See* Iodine.

FULLER'S EARTH. So called because it is used by fullers to facilitate the washing of cloth, fuller's earth is a native aluminium silicate containing a trace of iron. It has been much used in medicine as an astringent and drying powder in intertrigo, weeping eczema and the like.

FUNGUS. The low forms of plant life, known as fungi, are distinguished by the absence of chlorophyll, or green colouring matter. They are either parasitic on living plants or animals or feed on decaying organic matter, when they are called saprophytes. Amongst the plant forms belonging to this class are the moulds, the yeasts and larger types, mushrooms and toadstools.

From a health point of view, fungi are of importance because some of the smaller types cause ringworm and other skin diseases ; yeasts are used for making bread and fermented liquors ; and some of the larger types of fungus are eaten. In Great Britain it is customary to call an edible agaric a mushroom, and a poisonous one a toadstool. Bacteria are sometimes classed as fungi, but probably should be excluded from this class.

The common mushroom, agaricus, or psalliota, campestris, and the champignon, agaricus oreades, are the two fungi most often eaten in Great Britain. The common mushroom has a pale brown pileus, and the gills are pink at first but quickly become dark brown. The pileus of the champignon has a light to deep buff colour with brown gills. Poisonous agarics are, however, sometimes eaten by mistake for edible mushrooms, and no one who is inexperienced in the matter should pick fungi for food.

The symptoms and treatment of poisoning by fungi are detailed in the table of poisons under the heading Poisoning.

FUNGUS FOOT. In India and other tropical countries a disorder known as fungus, or Madura, foot occurs. The foot comes chronically enlarged and sinuses form at various parts of it from which matter containing white or black granules is discharged. These granules represent some species of fungus which is supposed to obtain entrance to the foot through an abrasion. Potassium iodide has been tried as a remedy, but the only satisfactory treatment is amputation.

GAIT. Some diseases produce a more or less characteristic gait. In locomotor ataxia the foot is lifted up suddenly and too far, then jerked forwards and brought down with a stamp, the patient meanwhile stooping forward with his eyes fixed on the movements of his feet. This is the ataxic gait and is caused by imperfect co-ordination. In disease of the cerebellum co-ordination may also be affected, but the gait is then like that of a drunken person.

In disease affecting the lateral columns of the spinal cord the gait is spastic. The limb moves stiffly, with apparent difficulty in bending the knee, and the foot is dragged forward over the ground. In hemiplegia, in which one side only is paralysed, the affected limb is swung round and forwards by twisting the body. When the muscles on the front of the leg are paralysed, causing foot drop, a steppage gait results. The foot is raised well off the ground to clear the toes and the person walks as if among high grass. In paralysis agitans the patient moves forward with quick, shuffling steps as if he were being pushed, the body being inclined forwards. *See* Ataxia ; Paralysis.

GALL. The rounded excrescences or nut-galls, produced on the oak, quercus infectoria, by the deposit of the eggs of a small wasp, contain tannic and gallic acids and are used in medicine as an astringent. Their action is entirely due to the tannic acid, however ; gallic acid possesses no astringency, either when used externally or internally. From powdered galls are prepared gall ointment and the ointment of gall and opium, which are often used in treating piles. Subgallate of bismuth, or dermatol is used as a dusting powder in eczema, etc.

GALL BLADDER. The pear-shaped bag known as the gall bladder lies on the under surface of the liver. It is about 4 inches long and $1\frac{1}{2}$ inches across at its widest part, and has a capacity of 8 to 10 drachms. Its wall is composed of plain muscle and fibrous tissue and it is lined with mucous membrane. Its narrower end, which is directed backwards, opens into the cystic duct and this runs across to join the hepatic duct at an acute angle, the junction of the two forming the common bile duct.

Bile passes into the gall bladder from the liver and is stored there till required for digestion. The acid chyme from the stomach passing over the surface of the duodenum causes a reflex stimulation of the muscle fibres in the wall of the gall bladder, and these contract and squeeze bile out of the bladder and into the duodenum.

Bacteria, and more especially the bacillus coli communis, a normal inhabitant of the bowel, and the typhoid fever bacillus, may invade the gall bladder. A chronic catarrhal inflammation may be thus set up and small masses of inflammatory products may form nuclei round which gall-stones grow. Inflammation of the gall bladder is called cholecystitis. After typhoid fever the germs of the disease may multiply in the gall bladder, from which at intervals they pass into the bowel to be discharged in the faeces, so that the person becomes a carrier of the disease. *See* Bile ; Liver.

GALL-STONE. Brownish concretions, or gall-stones, may occur in the gall bladder or in the bile ducts and may be as large as a hen's egg or no bigger than a grain of sand. They are light, floating in water, and have a soft and almost soapy feel. Their chief constituents are cholesterol and bile pigments, but there is also lime. They are derived from the bile but are deposited around a nucleus, formed by a little mass of bacteria or of inflammatory exudation.

If several gall-stones are packed together their mutual pressure causes flattened surfaces, or facets, so that the existence of such on a stone passed by the bowel shows that it has not occurred singly. Stones may long exist in the gall bladder without symptoms, but when a stone of any size moves down a bile duct it causes biliary, or gall-stone, colic. A stone may pass through the ducts and into the bowel, or may become stuck, or impacted, in a duct, and if this should be the common bile duct, jaundice will ensue.

The pain in biliary colic is in the pit of the stomach and towards the right ; it shoots through to the back on the same level and also up to the back of the right shoulder. It is agonising and may cause the patient to collapse. There is also vomiting and a certain amount of fever. While awaiting a doctor large, hot poultices should be put over the liver, and if vomiting is severe the patient should drink warm water with bicarbonate of sodium dissolved in it ; this will make the vomiting easier. In most instances a dose of morphia is necessary. The attack is brought to an end by the stone becoming impacted or by its slipping back into the gall bladder or through into the bowel.

An attempt has been made to dissolve stones in the gall bladder or ducts by giving salicylate of sodium and other drugs, but the only thing likely to be of any use is olive oil. A course of this should be taken, 3 or 4 ounces on an empty stomach, preferably first thing in the morning. When stones are known to be in the gall bladder or ducts an operation is desirable if the patient is able to stand it, as the presence of the stones involves certain risks, including that of cancer. The gall bladder may be opened and the stones ejected, or the bladder may be taken away altogether. *See* Bile; Gall Bladder; Jaundice; Liver.

GAMGEE TISSUE. A layer of absorbent cotton wool between layers of gauze constitutes what is called gamgee tissue. Its advantages are that it can be cut and handled more easily and neatly than the ordinary wool and provides a better surface on which to spread ointments. In pneumonia and other chest disorders a gamgee jacket, cut from a sheet of the tissue, is often worn. *See* Dressing.

GANGLION. An elastic swelling, connected with a tendon and due to an accumulation of a clear, jelly-like substance in the tendon sheath, is called a ganglion. It occurs in various situations, most commonly on the back of the wrist or hand, and, beyond the disfigurement, is of little account. An old-fashioned treatment was to rupture the sac by striking it with a heavy book, and the same may be accomplished by passing a knife through the skin and transfixing the sac.

The name ganglion is also given to collections of nerve cells occurring in connexion with cranial or spinal nerves or the sympathetic nervous system. These form, as it were, relay stations, whereby nervous impulses can be distributed over a wider area than would be possible for a single nerve, or their cells are concerned with the nutriment of the fibres to which they are attached. *See* Gassserian Ganglion; Sympathetic Nervous System.

GANGRENE. Death of a considerable portion of tissue is called gangrene or mortification. Apart from accident, the cause of gangrene is interference with the blood supply. Constriction of the arteries may be due to actual changes in the walls of the blood vessels such as occur in arterio-sclerosis, and senile gangrene is of this type. Chronic Bright's disease and diabetes are general diseases which favour the occurrence of gangrene.

If the blood supply through the arteries is cut off, and the venous blood and lymph flow away from the part, what is called dry gangrene results. If, on the other hand, these do not flow away, the condition is one of moist gangrene, more dangerous because of the greater risk of serious putrefactive changes.

When a part dies it becomes cold and insensitive, though at the same time there may be severe pain. It may be waxen or livid in appearance, and if dry becomes shrunken, brown and then black; if moist there may be considerable swelling, the skin may show the colour changes noticed in a bruise (q.v.).

Except in rapidly advancing gangrene, at some point above the dead or dying tissue a red line appears which has been called the line of demarcation. It is caused by inflammation, and in the course of some days the tissue here is replaced by granulation tissue, such as is found on an ulcer and a healing wound, and at this line, should the patient survive, a severance would take place between the living and dead tissues.

As the chief risk is that of bacterial invasion, it is essential that the skin over the dead tissue be kept as aseptic as possible. When a line of demarcation forms, amputation is done above it. If wounds are invaded by certain bacteria there is a rapidly spreading inflammation of the tissues accompanied by the evolution of gas in their substance, and large portions of tissue die. This condition is known as gas gangrene. *See* Caries; Frost Bite; Ischaemia; Necrosis; Raynaud's Disease; Wound.

GARGLE. The back of the throat may be cleansed and have drugs applied to it by gargling. A tablespoonful, or more, of the liquid to be used is taken into the mouth, the head is thrown back and the liquid allowed to run backwards, and the patient then breathes out through it. Young children and some adults cannot do this without gulping, so that liquids which may not be swallowed must be avoided. When inflammation is very acute gargling may be too painful, but it will suffice to let the liquid lie for a few moments in contact with the throat.

To cleanse the throat warm water with a pinch of common salt or of bicarbonate of soda, or both, may be used, or, if there is foetor, a weak-solution of permanganate of potassium. A pinch of powdered alum in warm water makes a good astringent gargle, or the following may be used:

Potassium chlorate	90 grains
Tincture of perchloride of iron	2 drachms
Glycerin	4 drachms
Water	to 6 ounces

A tablespoonful to be gargled.

Sometimes gargling aggravates irritation in the throat, especially if done too frequently. *See* Atomiser; Inhalation; Spray.

GAS POISONING. *See* Carbon Monoxide.

GASSERIAN GANGLION. A large collection of nerve cells, forming a thickening on the sensory root of the fifth cranial nerve, the Gasserian ganglion lies in a shallow depression on the tip of the temporal bone in the base of the skull. From it emerge the three divisions of the nerve. In trigeminal neuralgia it is sometimes necessary to remove this ganglion or to paralyse it by injecting alcohol into it. *See* Neuralgia; Trigeminal Nerve.

GASTRIC ULCER. The lining of the stomach is able, in its normal state, to resist the corrosive, or digestive, action of the gastric juice, but when its vitality is impaired part of the lining is digested off, leaving an acute ulcer. The devitalisation of the lining is almost always due to bacterial poisoning and this may have a definite origin such as septic teeth, a diseased appendix or gall bladder, or chronic stagnation of the large bowel.

Acute ulcers are usually multiple and may occur on any part of the stomach lining. It may chance that an acute ulcer does not heal, becoming chronic and possibly persisting for months or years; such an ulcer is usually situated on or near the lesser curvature of the stomach, and there is rarely more than one present. Most acute ulcers are under a quarter of an inch in diameter, but a chronic ulcer is commonly an inch across and may be three.

An acute ulcer rarely perforates the stomach wall, but there is always a risk of a chronic ulcer doing so. Another risk connected with a chronic ulcer is a fatal haemorrhage, though this is not such a frequent event as perforation; still another risk is that the ulcer will become cancerous. Acute gastric ulcers may be present without causing symptoms. There may, however, be dyspepsia and vomiting of blood, or haematemesis.

A chronic ulcer causes pain which comes on from a few minutes to one or two hours after eating and is generally relieved by vomiting; pain may also be felt in the back. There is tenderness over the epigastrium. From time to time there may be vomiting of blood, though this is not invariable. There is always, however, blood in the stools.

The treatment of an acute ulcer consists of rest in bed, a bland diet and a free administration of bismuth and alkalies. What is called the Lenhartz diet is commonly used. In this raw eggs and milk are first given, but in the course of a few days raw minced meat, rice milk, rusks, raw ham and butter are added, and some of the eggs are lightly cooked. This diet may be modified in various ways; for instance, pounded fish may be substituted for some of the eggs. Chronic ulcers are treated in the same way, but in certain circumstances an operation becomes necessary. In all cases of gastric ulcer, whether acute or chronic, any focus of infection which is discovered should be cleared up. *See* Duodenum; Indigestion; Stomach.

GASTRITIS. Inflammation of the lining of the stomach, otherwise gastritis or gastric catarrh, may occur as an acute disorder or may be chronic. Acute gastritis may be caused by overloading the stomach with food; by taking decomposing food, an accident more likely to occur in hot weather; by an alcoholic bout; or by taking some other poison capable of causing irritation. It may occur at the beginning of an infectious fever.

At the beginning the patient feels dull and depressed and usually suffers from headache. There is fullness in the pit of the stomach, a sense of weight and perhaps pain. There may be belching of wind. Nausea is felt sooner or later and culminates in vomiting. At first the vomited matter consists of undigested food, but later there is much mucus and bile, and the appearance of the last may lead to the disorder being described as a bilious attack. The bile, however, has nothing to do with causing the symptoms ; it is merely drawn by vomiting into the stomach from the first part of the small bowel. The tongue is covered with white or yellowish fur, the breath is unpleasant, and there may be a free flow of saliva. In children there is diarrhoea, with colicky pains, as a rule.

Such an attack does not usually last much longer than 24 hours, but severer attacks occur in which there is considerable fever and with corresponding urgency in the other symptoms Such an attack may last for four days or more.

In the treatment of acute gastritis it is obviously desirable to clear irritating contents out of the stomach, and this may be done in a natural way by the onset of vomiting, which should be encouraged rather than otherwise. By drinking large draughts of tepid water the patient will make the process of vomiting easier and will help to cleanse the stomach. Should vomiting be delayed it may be brought on by a simple emetic, such as a tablespoonful of mustard or 2 tablespoonsful of salt in a glass of tepid water.

As the symptoms abate, milk in some form should be given, as whey, for example, or with the addition of 1 to 3 grains of sodium citrate to the ounce, or milk and soda water. Thereafter, arrowroot or other milk foods are added, and then sweetbreads or steamed, white fish. Ordinary food is not resumed for two or three days. When the gastritis is due to some irritant poison, however, thin arrowroot or some other demulcent drink is given as soon as an emetic has acted, as is described under the heading Poisoning. Amongst drugs most used for calming the irritation of the stomach, bismuth (q.v.) takes the chief place.

Chronic gastritis may follow an attack of the acute disorder, but more frequently begins insidiously. It may be caused by habitual over-indulgence in food or alcohol, in tobacco and, in some parts of the world, in iced drinks. Habitual failure to chew food properly is another cause. Many suffer from the disease from swallowing septic discharges from the teeth, from the sinuses of the nose or from tonsils and adenoids. A chronic ulcer or other organic disease of the stomach is likely to be accompanied by chronic gastritis.

There is a fullness in the pit of the stomach and perhaps dull pain, worse after food but often almost continuous. The pain may sometimes take the form of a hot burning feeling about the lower end of the breast bone, referred to as heartburn, or of a more acute pain in the heart region. There is a diffuse tenderness over the pit of the stomach. The appetite is normally poor, but at times may be very keen. Nausea in the morning is common. Headache is common and there may be a liability to giddiness.

Sound dietetic habits must be insisted on ; alcohol should preferably be discontinued, and if tobacco is used at all it should be very moderately. Food should be plain but varied. Spiced food, pastries, pickles and fried food should be avoided. The amount of food should be moderate and meals should be properly spaced, say, at four-hourly intervals, the last heavy meal being not later than three hours before bedtime.

As regards medicinal treatment it will usually be necessary to take a laxative to promote regularity of the bowels. It is often useful to take a pinch of bicarbonate of soda thrice daily, about 20 minutes before the principal meals, or a little Gregory's mixture, say, as much as will lie on a sixpence. *See* Constipation ; Digestion ; Indigestion ; Stomach.

GAULTHERIA. Also known as oil of wintergreen, oil of gaultheria is a fragrant oil containing more than 90 per cent of methyl salicylate, and with oil of sweet birch is the chief source of natural salicylic acid. It is used as an outward application for joint and muscular rheumatism, but, as the natural oil is somewhat expensive, it is generally the artificial, also called methyl salicylate, that is chosen for this purpose. *See* Salicylic Acid.

GENERAL PARALYSIS OF THE INSANE. The disease described as general paralysis of the insane (popularly termed G.P.I.), general paresis or paralytic dementia, is a disease in which, from inflammatory and degenerative changes in the grey matter of the brain, both mental disorder and paralysis of muscles occur.

The mental symptoms usually appear first, and at the beginning are slight and indefinite, a slacker attention to the duties of life and loose moral conduct which may go on, however, as far as foolish business transactions, flagrant moral faults or even crime, before the fact of mental disease is appreciated.

It would be found, however, that the patient's memory was weakening, also his power of concentrating attention on anything and that mental and physical work soon produced fatigue. Slovenliness and even dirtiness in habits would also probably be noted. The speech might be slow and hesitating, with slight tremor of the lips and tongue, the pupil unresponsive to the action of light, and the knee jerks exaggerated.

As the disease progresses, the speech becomes more slurring and indistinct, the handwriting more shaky and disjointed. Standing becomes increasingly difficult until finally the patient is bedridden, helpless, mindless, and the bladder and bowels are uncontrolled. Bed sores are very liable to form, and some intercurrent disease brings the story to a merciful end. Generally the duration of the disease is from two to three years. It usually appears about middle life, and most often in men.

The essential cause of the disease is syphilitic infection, although only a small proportion of those who are infected or who have congenital syphilis suffer in this way. The relatively greater prevalence amongst town dwellers suggests that mental stress and strain may have a predisposing effect.

A person suffering from general paralysis should be put into an institution for mental diseases. Drugs that cure ordinary manifestations of syphilis have little effect on general paralysis, though possibly the organic arsenical compounds might arrest the disease at a very early stage. Within the last few years many cases have been treated by inoculation with malaria, and it has been claimed that the disease has been cured when this was done at an early stage, and that in more advanced cases there has been improvement.

These effects appear to be due simply to the fever rather than to any other effect of the existence of the malarial parasite in the patient's body. *See* Brain ; Locomotor Ataxia ; Syphilis.

GENITAL SYSTEM. The male elements in generation, spermatozoa, are formed in the testicles, two glands situated in the scrotum, or bag, which is partitioned into two chambers for their reception. The testicle is developed in the abdomen and does not make its way out into the scrotum until about two months before birth. Sometimes, in fact, it may fail to emerge, or descend only part of the way.

Behind the body of the testicle there is an elongated mass, the epididymis, representing the tubules that carry the spermatozoa from the gland, and a convoluted main tube into which the tubules pour the secretion. From the lower end of the epididymis the vas deferens, or duct proper of the testicle, passes up out of the scrotum, through the inguinal canal in the front wall of the abdomen, and down into the pelvis as far as the base of the bladder, where it empties into the seminal vesicles, of which there is one on either side. Accompanying the vas deferens in the inguinal canal and thence into the scrotum are arteries, veins, nerves and lymphatics.

The testicular secretion is stored in the seminal vesicles and is discharged from them through the ejaculatory ducts, which open in the floor of the back part of the urethra, or discharge tube of the bladder, along with a certain amount of secretion from the prostate gland ; the whole constituting the semen. The introductive organ, or penis, consists of three columns of erectile tissue which terminate in the glans penis. The urethra passes forward and emerges at the tip of the glans, its opening being called the meatus. Under stimulation by nerves the blood circulation is modified so that the spaces in the erectile tissue become engorged with blood and the organ is made rigid.

The skin over the glans is usually prolonged forward to form the fore-skin, but this can generally be retracted to expose the whole glans. Sometimes, however, this is impossible on account of the fore-skin being too tight, a condition described as phimosis, and the consequent difficulty in keeping the glans clean may result in much irritation.

Sometimes when a tight fore-skin is fully retracted the glans swells and the fore-skin cannot be brought forward again. This is called paraphimosis, and the longer it persists the greater the swelling and pain. It is generally treated by tightly compressing the glans till it is reduced in size, but sometimes a little operation is necessary.

Besides producing spermatozoa the testicles form an internal secretion, or endocrine (q.v.), which has much influence on the development and maintenance of male characteristics.

The commonest diseases of the male genital organs, apart from phimosis, varicocele and hydrocele, are those of venereal origin, gonorrhoea and syphilis. In view of their possible consequences both are of very great importance. Gonorrhoea causes inflammation of the urethra, or urethritis, and possibly of the seminal vesicles and of the testicle, orchitis. Probably there is inflammation of the glans also, balanitis. The infection may be conveyed to the eyes and may also cause general blood poisoning. In syphilis a sore, usually on the glans or fore-skin, marks the local infection, but there is a rapid extension by the blood to all parts of the body. In the third stage of the disease there may be an enlargement of the testicle by the development of a gumma.

A varicocele consists of enlargement and varicosity of the veins of the pampiniform plexus; a hydrocele is a collection of serous fluid in the tunica vaginalis; sometimes the fluid is milky, a chylous hydrocele; and sometimes blood, a haematocele, this being caused by an injury.

The external genital organs in the female, known as the vulva or pudendum, are bounded in front by a pad of fat, the skin over which is covered with hair. This is called the mons veneris, and from it proceed backwards, and curve inwards, two folds, also consisting largely of fat, the labia majora. Within these at the front are two shorter folds, the labia minora or nymphae, placed like an inverted V, and at the apex is a sensitive, erectile organ, the clitoris. Some distance behind this is the orifice of the urethra, the tube coming from the bladder, immediately behind this orifice again being the entrance to the genital passage, the vagina.

In a virgin the vaginal orifice is partially closed by a membrane, known as the hymen. It may chance that the hymen is imperforate, and then there will be retention of the menses, for the release of which, division of the membrane by a small operation is necessary. The orifice of the vagina is separated from the anus, or orifice of the rectum, sometimes called the back passage, by the perineum.

The vagina is about 3½ in. long and leads up to the womb. Its front wall is in close contact with the urethra and, higher up, with the bladder itself, while its back wall is in close contact with the rectum. It follows from this that, from injury or disease, the partition may be perforated and a fistulous opening established between the vagina and the bladder, or the rectum, as the case may be.

The womb, or uterus, is a pear-shaped organ, but is flattened from before backwards. In a woman who has borne children it is generally about 3 in. long, 2 in. broad, and 1 in. thick. The thinner portion, called the cervix, or neck, is directed downwards, projecting in fact into the upper part of the vagina. The rest of the womb constitutes the body, the cavity of which is roughly triangular in shape, the base of the triangle being uppermost, and at the upper two angles are situated the inner openings of the Fallopian tubes. The part of the womb above these openings is generally referred to as the fundus.

Each Fallopian tube is about 4½ in. long and its outer end opens into the general peritoneal cavity. It is surrounded by a fringe of finger-like processes, or fimbriae. The tube, which is lined with ciliated epithelium, is for the passage of ova, or ovules, from the ovary to the womb, the onward course of an ovum being furthered by the lashing movement of the cilia, or tiny hair-like processes projecting from the epithelial cells.

The womb, which is composed largely of muscular tissue, is covered by peritoneum, folds of which pass out in several directions, attaching the organ to neighbouring structures. Such a fold, stretching out on either side to the wall of the pelvis, is called the broad ligament, and between the layers of peritoneum which compose it several structures are contained, including the Fallopian tube in the upper border of the fold, the round ligament, which passes forward from the womb and through the inguinal canal to be attached to the front of the pubic bone, the ovarian ligament uniting the ovary to the womb, blood vessels, nerves, lymphatics and a mass of loose cellular tissue. The ovary lies behind the broad ligament and near the pelvic wall. It is 1 to 2 in. long, ¾ in. broad and ½ in. thick. It is covered with epithelium from which are developed the Graafian follicles, within which the ovules develop. When a follicle is ripe, or, in other words, the ovule is ready to be impregnated, the follicle bursts and the ovule is discharged.

Besides producing the ovules, or female cells from which new individuals may be developed, the ovary appears to form an internal secretion, to the existence of which female characteristics are due, at any rate in part. In pregnancy an ovarian secretion also seems to promote development of the womb and breasts, and, by stimulating the posterior part of the pituitary body, to affect the metabolism of sugar, as sugar may appear in the urine during pregnancy.

Inflammation of the external genitals, or vulvitis, may be caused by friction, by a want of cleanliness, by the irritation of threadworms, which have made their way forward from the bowel, especially in children, or by infection of some kind. In elderly women vulvitis should always suggest an examination of the urine, as the presence of sugar may be the cause of the irritation. Vulvitis may be caused by an irritating vaginal discharge.

An active infection in the vagina is a serious matter, as it may extend to the womb and thence to the Fallopian tubes, which open at their outer ends into the peritoneal cavity; thus general peritonitis may ensue. If the inflammation is limited to the peritoneum on, or in close proximity to, the womb it is described as perimetritis, and if it occurs in the cellular tissue between the layers of the broad ligament it is called parametritis.

Besides infection introduced into the vagina from without, another fruitful source of infection of the genital tract is decomposition of blood-clot or of membranes or other foetal products. Infection may also be brought in the blood-stream, however, as when tuberculosis effects the genital organs; or it may extend from the bowel, a diseased appendix, for instance. Inflammation of the lining of the womb is called endometritis, and of the wall of the organ, metritis; of the Fallopian tube, salpingitis, and of the ovary, ovaritis. The womb is one of the commonest sites of cancer. *See* Endometritis; Gonorrhoea; Hydrocele; Ovary; Perimetritis; Phimosis; Prostate; Syphilis; Testicle; Urethra; Vagina; Varicocele; Womb.

GERMAN MEASLES. Also known as rubella, German measles is a mild but highly infectious disease, which occurs in epidemics, usually in spring or early summer, amongst both children and adults. The specific cause has not been identified. The period of incubation is from 1 to 3 weeks, and the initial symptoms are slight, perhaps running at the nose and a little soreness of the throat with a slight rise of temperature.

The rash appears after 24 to 48 hours, first on the face, forehead, scalp and behind the ears, and then elsewhere on the body. It consists of rounded, rose-red spots, slightly raised above the ordinary level of the skin, quite separated, as a rule, except that they tend to run together on the trunk, and suggest the rash of scarlet fever. The rash lasts for about three days, and when it disappears, there is fine scaling or desquamation.

A notable feature of German measles is that there is enlargement of glands, not only of those at the angle of the lower jaw, which may happen in scarlet fever and other infectious diseases, but behind the ears, in the occipital region of the head, in the armpits and in the groins. The glands never suppurate.

The treatment is that of fever (q.v.) generally. The patient should be isolated; he remains infectious for about ten days after the appearance of the rash. While there is fever he should be confined to bed.

The patient, on recovery, should have a bath and put on fresh clothing before leaving the sick-room. Bedding and bed-clothing should be soaked in a disinfecting solution. To disinfect the sick-room it usually suffices to air it thoroughly. Children who have been in contact with a patient suffering from German measles should not return to school until 21 days have elapsed since the last contact. *See* Fever; Infectious Disease.

GERMICIDE. Agents such as dry or moist heat, corrosive sublimate, cresylic acid, etc., that are able to kill germs are called germicides. *See* Antiseptic ; Disinfectant.

GIDDINESS. *See* Dizziness.

GLAND. In its simplest form a gland consists of a short tube, open at one end but blind at the other, or of a little sac or bag, either tube or sac being lined with epithelial cells. Outside the layer of cells are blood vessels, and from materials supplied by these the cells build up a substance, or secretion, which they pour into the tube, and which is discharged through the opening.

A large variety of substances are produced by glands, including numerous ferments, such as those of the gastric and pancreatic juices, which initiate chemical changes in the substances on which they act ; the former of these juices is an acid secretion and the latter alkaline. Amongst other secretions are the sweat, the oily secretion on the skin, the urine and so on.

There are some glands which have no ducts, but which empty their secretions into the blood either by blood capillaries or lymph channels. These are called ductless or endocrine glands, and of this nature are the thyroid, the supra-renal bodies and others.

What are popularly called glands, as in the expression " glands of the neck " are really collections of lymphoid tissue, or lymph-nodes, and are described under the heading Lymphatic System.

If the duct of a gland is blocked, say by a calculus, or stone, the secretion goes on, and its accumulation causes a dilatation of the gland behind the obstruction, so that a bag of fluid results ; this is called a retention cyst. Inflammation of a gland is called adenitis, and a tumour with a glandular structure, an adenoma. *See* Endocrine ; Lymphatic System.

GLANDULAR FEVER. A specific infectious disease, occurring in epidemics, glandular fever mostly attacks children. Its onset is sudden, with headaches and possibly abdominal pain. Almost at once, and in any case within 24 hours, the glands in the neck become swollen ; in many instances glands in the armpits and groins are also enlarged, and possibly the liver and spleen. The throat may be reddened, but the tonsils are not enlarged, and there is no rash. The temperature is commonly fairly high and may reach 104° F., but after three or four days quickly declines ; but though the size of the glands lessens they remain palpable for some time. Convalescence is usually rather slow.

The treatment is that of fever (q.v.) generally. The patient should be isolated for a fortnight, and children who have been in contact with cases should remain away from school for the same period. *See* Gland ; Mumps.

GLAUBER'S SALT. The sulphate of sodium is also known as Glauber's salt. It acts as a saline cathartic. *See* Sodium.

GLAUCOMA. An eye disease in which the eyeball acquires a stony hardness, glaucoma is due to interference with the flow of the aqueous humour into the canal of Schlemm, which lies near the margin of the cornea; the humour accumulates therefore, and the tension inside the eyeball is correspondingly raised. This causes deterioration of the delicate structures within the eye.

Middle-aged people are mostly affected, and especially women. The disease may come on acutely with severe pain shooting through the head from the eye, which looks inflamed, and the vision of which is much dimmed. The pupil is dilated, and the cornea is dulled as if it had been breathed on. Often there is vomiting, and the condition may be diagnosed as acute dyspepsia. The onset of acute glaucoma may be foreshadowed by a sudden increase in the difficulty in reading small type, dimness of vision and the appearance of coloured halos around lights. In chronic glaucoma there is no pain, but the patient seeks advice on account of increasing dimness of sight. Unless relieved, glaucoma leads to total blindness of the affected eye.

Drugs which contract the pupil lower the intra-ocular tension to some extent, and are indicated in glaucoma. Eserine or physostigmine from the calabar bean (q.v.) is the most powerful of these, but pilocarpine is often used. Operations are also necessary to cure glaucoma. *See* Eye.

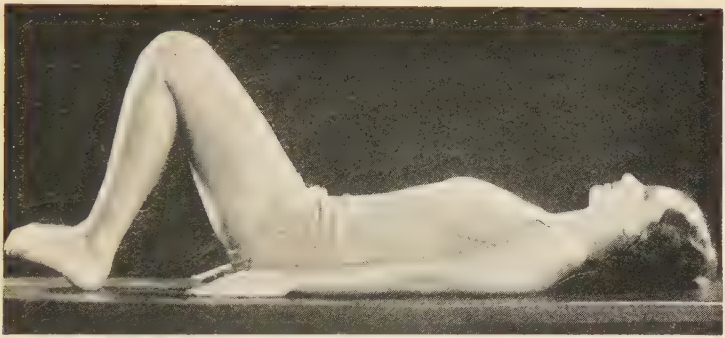
GLOSSO-PHARYNGEAL NERVE. The ninth cranial, or glosso-pharyngeal, nerve arises partly from nuclei in the medulla, or bulb, of the brain, and partly from cells in ganglia on the nerve trunk itself. Some of the fibres are motor, supplying muscles in the wall of the pharynx, the others being sensory, providing ordinary sensation to the pharynx, tonsil, and other parts.

GLOTTIS. The upper opening of the larynx, or voice-box, is called the glottis. It is nearly closed when sounds are being produced, but opens up for breathing. The chink, which varies in size, is called the rima glottidis. *See* Larynx.

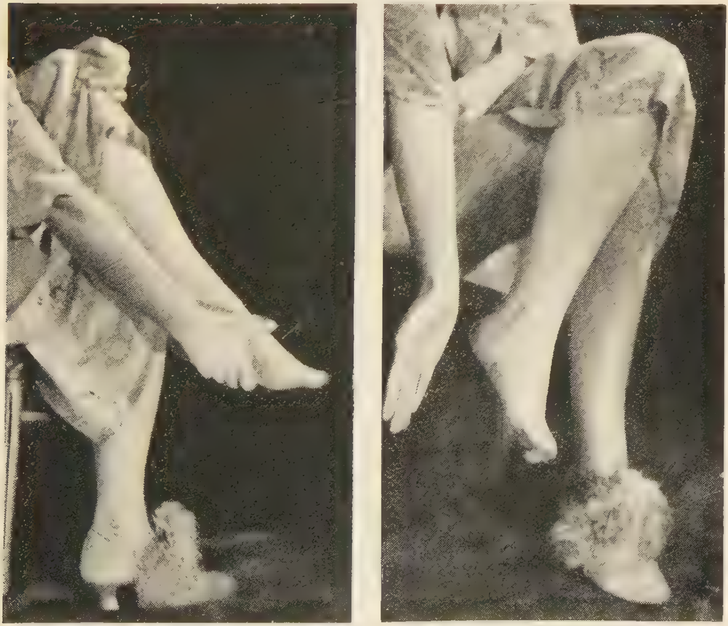
GLYCERIN. A colourless, viscous substance with a sweet taste, glycerin, or glycerol, is produced when fats are broken up; it is a by-product, for example, in soap-making. Chemically it is an alcohol. It is used as a flavouring agent in mixtures and as a substitute for sugar by diabetics. It rapidly absorbs water, and this explains its usefulness for chapping of the hands, the lips, or the nipples, as chapping is caused by excessive dryness of the skin. A useful application for this is glycerin and rose water. If applied to the skin, without dilution, glycerin may cause considerable irritation.

Glycerin is added to gargles, as it may keep the drugs contained in these longer in contact with the mucous membrane of the throat. It is a good solvent for iodine and other substances, and so is often used to make a paint for the throat.

GLYCEROPHOSPHATES. Preparations of glycerophosphoric acid are esteemed as tonics, and especially during convalescence from acute diseases. The glycerophosphates of iron and calcium are the most useful salts. The compound glycerol of glycerophosphates B.P.C., the glycerol of glycerophosphates with red



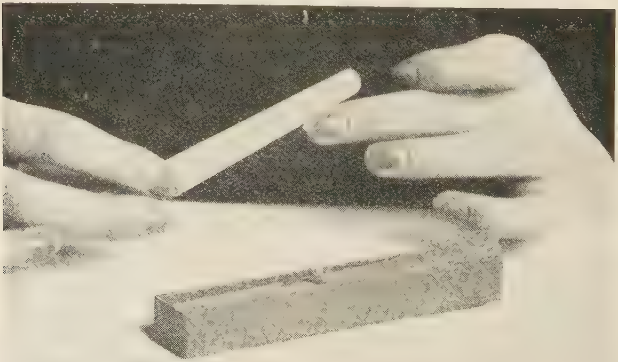
Although the entire body appears to be concerned, this exercise is designed for lifting and strengthening the arches of the feet, upon which depends not only the shape of the foot, but the whole matter of ease and grace in walking and standing



Left. Simple massage of the arches of the foot from front to back with the hand will help to tone up the muscles and so strengthen and improve the ankles. Right. Continuing the massage of the arch

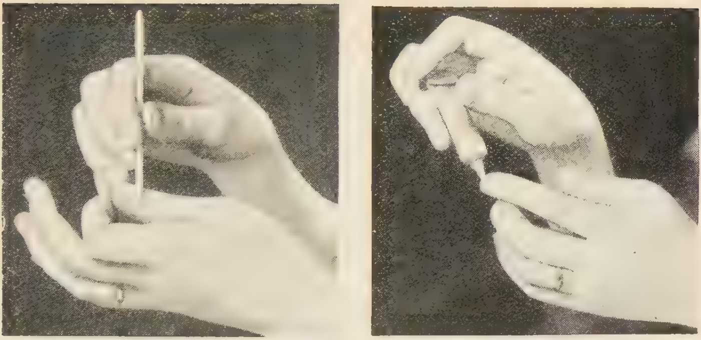
EXERCISE AND MASSAGE FOR STRENGTHENING THE FEET

Hair. The normal hair in health requires only to be kept clean and given sufficient daily scalp massage and brushing to maintain its vigour and stimulate its natural oily secretions. The more thorough the brushing the better



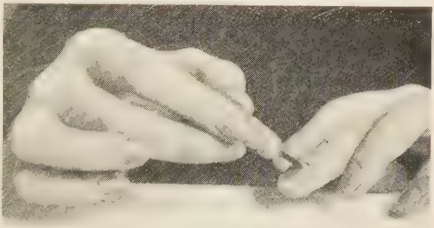
Hand. First stage in manicure. The nails are first filed and the edges bevelled with an emery board

CARE FOR THE HAIR AND THE HANDS



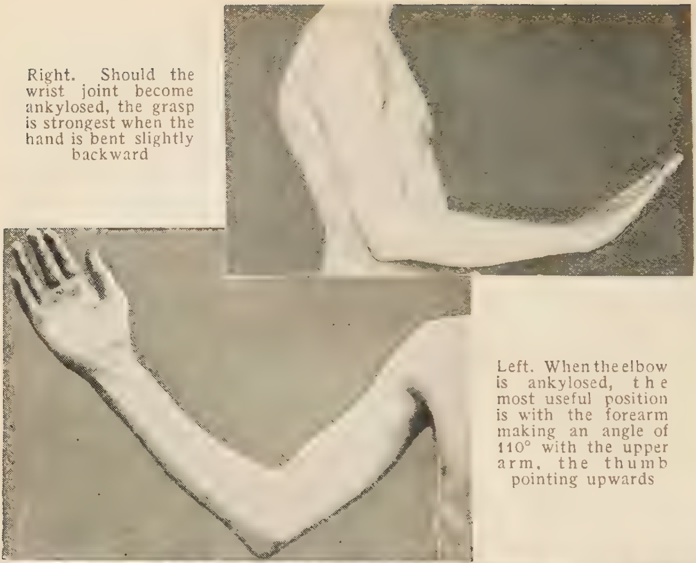
In thorough manicure, which should be carried out weekly, it is important to press the cuticle back with an orange stick (left) and to whiten the tips of the nails (right), special preparations being available for the latter purpose

Right. The final stage in manicure is polishing the nails. This may be done by painting them with liquid nail enamel, allowing it to dry on, or by the use of a nail paste powder



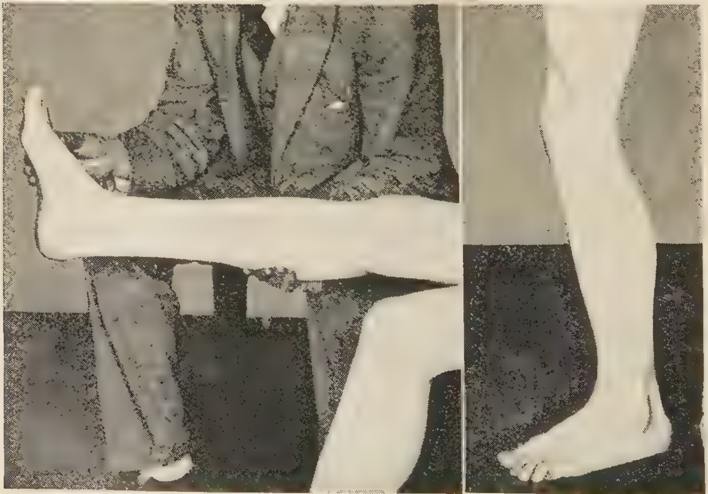
Left. Final treatment for the hands by rubbing in vanishing cream, working from the wrist upwards

HANDS: DETAILS OF THE WEEKLY MANICURE



Right. Should the wrist joint become ankylosed, the grasp is strongest when the hand is bent slightly backward

Left. When the elbow is ankylosed, the most useful position is with the forearm making an angle of 110° with the upper arm, the thumb pointing upwards



Left. An ankylosed ankle should be fixed with the foot making a right angle with the leg at the ankle joint. The necessity for a surgical boot will then be avoided. Right. The most useful position for an ankylosed knee is with a slight bend, as the patient is able to sit more comfortably than with a straight leg

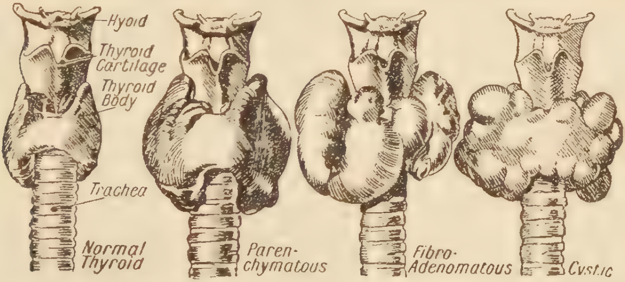
JOINT : THE BEST POSITIONS WHEN ANKYLOSIS THREATENS

bone marrow B.P.C., the yellow syrup of glycerophosphates B.P.C., the compound syrup of glycerophosphates B.P.C., and the syrup of glycerophosphates with formates B.P.C., are used as tonics in doses of 1 to 2 drachms. A combination of glycerophosphates with casein is found in Sanatogen and similar "foods."

GLYCOSURIA. The presence of sugar in the urine is described as glycosuria. As a transient phenomenon this has been found in many different conditions; when more or less constant it is due to diabetes mellitus. The younger the person in whom glycosuria occurs, the greater the likelihood of its being diabetes. *See* Diabetes; Urine.

GNAT. *See* Mosquito.

GOITRE. An enlargement of the thyroid gland is called a goitre or bronchocele. The enlargement may represent what is called a simple goitre; on the other hand, a goitre may be associated with symptoms of poisoning, as from an overdose of thyroid secretion, a disorder which is described under the heading Exophthalmic Goitre. In a third group the enlargement is caused by a malignant growth.



GOITRE. Normal thyroid gland (left) and three types of simple goitre

A simple goitre may be nothing more than hypertrophy of the gland, the normal structure of which is retained (parenchymatous). This type is endemic in many mountainous regions; in Great Britain its prevalence in Derbyshire accounts for its being sometimes called Derbyshire neck. The enlargement as a rule involves the whole gland. Another, known as the diffuse colloid variety, is especially prevalent in some lowland districts; this enlargement is also general, but the minute structure differs from the normal. In another type still, the enlargement is localised in a lobe or in the isthmus as a rule; sometimes irregular swellings occur in more than one of these parts.

The enlarged gland in goitre causes a fullness in the neck, and in course of time may acquire such dimensions as to cause serious disfigurement. Even when large, however, it may cause no discomfort; on the other hand, even a small goitre may press on the windpipe and create a feeling of choking. Goitre occurs more frequently in women, and apparently this susceptibility has something to do with other internal secretions.

The development of a simple goitre has some relation to the supply of iodine to the tissues of the body. The secretion of the thyroid gland contains an organic preparation of iodine, and the most obvious explanation of a simple goitre is that it represents an increased effort to maintain or increase the supply of iodine to the tissues.

An infection may be caused by sewage pollution of drinking water, as it has been generally observed that the incidence of goitre seems to be closely connected with drinking water. Water can be deprived of this unwholesomeness by boiling it. In districts where goitre is endemic, therefore, all drinking water should be boiled. Another preventive is to give small doses of iodine regularly, say, as iodised common salt or as potassium iodide. The administration of thyroid extract or iodides will also cure the simple goitre in the early stages. It is necessary, especially when the goitre occurs away from an endemic centre, that sources of poisoning in the patient's own body, such as septic teeth or tonsils, for example, should be thoroughly cleaned up. When the goitre is interfering with breathing an operation is needed.

A malignant goitre may be either a sarcoma or a carcinoma, but is more frequently the latter ; an early removal by an operation is necessary. *See* Cretinism ; Endocrine ; Exophthalmic Goitre ; Thyroid Gland.

GONORRHOEA. A contagious disease, gonorrhoea is caused by a microbe called the gonococcus, and is most commonly contracted from sexual intercourse with an infected person, though a large number of infants have their eyes infected during birth because of infection existing in the mother. In a certain number of cases infection is due to contact with privy seats, clothing, towels, etc., polluted with gonorrhoeal discharges.

The period of incubation, that is, the time elapsing between exposure to infection and the first appearance of symptoms, is from three to twenty-one days, the average being five days. In the male there is first of all a burning pain in the urethra when passing water, which is quickly followed by a discharge, thin and clear to begin with, but shortly becoming thick, and whitish or yellow from the presence of pus.

There is usually feverishness, loss of appetite and constipation. Under proper treatment, and should no complications occur, the discharge gradually diminishes, and generally disappears in the course of four to six weeks, but if complications occur, treatment may have to be continued for many months. If the foreskin is long, and especially if it is at all tight, there may be an accumulation of pus beneath it requiring release.

The complications which delay a cure, however, are those due to extension backwards of the infection or its extension into the blood stream. The disease may reach the bladder, causing cystitis, the occurrence of which is signalised by frequent and urgent calls to pass water although there is but little to pass. From the bladder the infection may pass upwards to the pelvis of the kidney and the substance of this organ itself, resulting in pyelonephritis. Inflammation of the prostate gland at the neck of the bladder may also occur. Another route along which the infection may proceed is to the seminal vesicles and the testicle, inflammation of the epididymis taking place, and the testicle becoming swollen and very painful.

Invasion of the blood stream with gonococci constitutes a form of septicaemia, and, as in other forms of this blood poisoning, inflammation of various organs and tissues may result; for example, of the lining of the heart, of the pleura, of the lungs or of joints. The last-mentioned complication is usually referred to as gonorrhoeal rheumatism, and its cure may be difficult.

If gonorrhoea settles down into a chronic condition there may be little or no discomfort, but the persistence of mischief in the urinary passages is shown by the appearance of a drop of discharge, particularly first thing in the morning, and the urine commonly contains so-called threads, caused by chronic prostatitis. Chronic gonorrhoea is often referred to as gleet. So long as this condition persists the patient is capable of communicating the disease. A possible sequel to an attack of gonorrhoea is a stricture (q.v.) of the urethra.

The treatment of gonorrhoea should invariably be supervised by a doctor. There are many free clinics scattered over the country for those whose means are limited. A person affected with the disease should exercise the greatest care against conveying the infection to others or to his own eyes. He should not use a common towel, and should use sufficient cotton wool or clean rags, preferably in a rubber bag, say a sponge-bag, to absorb the discharge, the cotton wool or rags being afterwards burned. It is desirable also to wear a suspensory bandage.

A solution of permanganate of potassium, say 1 grain in 8 ounces of water, should be used as a lotion for cleansing the parts, and would also make a suitable injection for the urethra. This injection is made several times a day after the bladder has been emptied, a small glass syringe with a blunt nozzle being used for the purpose. A common mistake is to have a urethral injection too strong and thereby cause additional irritation. Some drugs for internal use have a reputation for usefulness in this disease, such as oil of sandalwood, cubebs and copaiba, though, as a rule, only the first mentioned is suitable for the very acute stage. Sometimes vaccines are very helpful.

A laxative should be taken if there is any constipation, as it is important that the bowels should move every day. The diet should be light and bland during the acute stage; alcohol and condiments should be avoided. Water, diluted milk or barley water should be taken freely, and it is an advantage to add a pinch of baking soda to the draught. Clothing should be sufficiently plentiful and warm to secure the body from chill.

Treatment should be continued conscientiously until, in the opinion of the doctor, the disease is eradicated. No man who has suffered from gonorrhoea should marry before submitting himself to special tests of his freedom from the disease. These are applied by an expert, if necessary, at a clinic.

In the female the disease also invades the urinary passages and may extend to the bladder and kidneys, but it is usually the genital passages that bear the brunt of the disease. There may not be much pain, but there is a thick yellow discharge from the vagina or front passage. The infection may extend to the womb, the Fallopian tubes and the ovaries. Disturbance of menstruation is a frequent result, and also sterility. Medical supervision of treatment is again necessary. Douching with permanganate solution helps towards cleanliness, but more energetic measures are necessary.

Infection of the eyes occurring in infants is discussed under the heading Conjunctivitis. Besides the risk from an infected mother, it should be borne in mind that anyone might have the eyes infected, say, from a towel soiled with discharge. This disease involves a grave threat to vision, and must be carefully and thoroughly treated. When one eye only is affected it is customary to try to protect the other by applying what is called Buller's shield ; this is an ordinary watch-glass, kept in position over the eye by strips of adhesive plaster, which are continuous all round the glass. *See* Conjunctivitis ; Prostate.

GOULARD'S EXTRACT. The strong solution of lead subacetate is also called Goulard's extract. From it is prepared, by the addition of spirit and dilution with distilled water, the diluted solution, or Goulard's water or lotion, the usual constituent of a lead lotion. The following is very useful for painting on patches of inflammation on the skin, especially when there is intense itching : Goulard's extract, liquor carbonis detergens, and rectified spirit, ½ ounce of each. *See* Lead.

GOUT. Also known as padogra, gout is a disorder of metabolism in which uric acid accumulates in the blood and tissues and causes various kinds of manifestations. The tendency to gout is often inherited and may be transmitted through females who show no signs of the disease themselves. Other causes are an excessive consumption of rich food and of wines, especially champagne, burgundy and port, or of malt liquors. A regular and copious consumption of malt liquor, even when the food supply is spare, results in what is called poor man's gout. Sedentary habits predispose. Women are rarely affected except after the change of life, and not very often even then.

An acute attack of gout, not so frequent an event as it once was, is due to the deposition of crystals of biurate of sodium in the cartilages of a joint. Normally this is present in the blood and tissue fluids, and something happens in gout to throw it out of this into a flocculated state. A poor circulation in the part, some slight injury or something similar may be the exciting factor, but the excess of uric acid in the blood and tissues which is the essential feature of gout, alone makes the attack possible.

Prior to an attack there may be irritability of temper, dyspepsia and other premonitory symptoms. Then, suddenly, in the small hours of the morning, a joint, which in a first attack is most often that of the ball of the right great toe, is seized with excruciating pain and becomes swollen, red and hot, while the patient becomes fevered. The pain generally eases off in the course of a few hours, but recurs on the following and several succeeding nights, though with lessening intensity.

The painful joint should be treated by heat in some form ; cold applications are dangerous. The best drug for relieving the pain is colchicum, either the wine or the tincture, in doses of 20 to 30 minims every four hours, until the pain ceases ; but colchicum should only be used on medical advice, as it may cause depression. Water or gruel containing potassium bicarbonate should be drunk freely. On the night of the attack it is well to take a mercurial purge, say 3 or 4 grains of calomel and follow this up with a dose of Epsom salt in the morning. The diet should be restricted to milk and barley water.

In chronic gout more joints are affected and there is a greater tendency to deposits in the soft parts about the joints and elsewhere, such deposits, or tophi, sometimes ulcerating through the skin, so that a person whose finger joints were affected has been able to write with them on a blackboard. Because of their white, chalky appearance, these deposits are sometimes called chalk-stones ; they do not, however, consist of chalk but of sodium urate. The external ear is a common site for a tophus. In chronic gout there is a tendency to arterio-sclerosis (q.v.) with enlargement of the left side of the heart and nephritis.

The manifestations of irregular gout are very varied. Biliousness, arterial disease, migraine, hot, itching eyeballs, eczema, urinary gravel, glycosuria, chronic bronchitis, iritis or some other disorder may be found to depend on the gouty habit.

A person who is of the gouty habit, or, as it is also put, is subject to the gouty diathesis, should be moderate in eating, avoiding fats and rich food, meat extracts, sauces, liver, kidney and sweetbreads, and restricting red meat, starchy foods and sugar. Fruit and vegetables may be taken, but, as a rule, tomatoes, cucumber, rhubarb, bananas, gooseberries, currants and strawberries are unsuitable. Potatoes may generally be allowed. Asparagus and beans and other pulses should be taken in small quantities only. Alcohol is best avoided altogether, but if any is taken it should be in the form of spirits, claret or hock, in moderate quantities and freely diluted. Sparkling cider may be harmful, though dry, still cider is usually safe. Water should be taken freely. An active open-air life should be adopted. Clothing should be warm and the skin should be kept active by regular baths and brisk friction with a towel. *See* Arterio-sclerosis ; Colchicum ; Diet ; Metabolism.

GRANULATION TISSUE. Almost invariably a wound is healed by the formation of granulation tissue, which consists of large, round cells derived from the connective tissue in the neighbourhood of the wound. Granulation tissue also covers ulcers, lines abscess cavities and sinuses, and forms around foreign bodies embedded in the tissues.

Sometimes there is an overgrowth of granulation tissue ; it is then said to be exuberant, or, in popular phraseology, constitutes proud flesh. On the other hand, as in a callous ulcer, the granulations may be pale and watery-looking. If healing proceeds, the round cells become elongated and ultimately form scar tissue.

A granuloma is a tumour composed of granulation tissue and occurs in tuberculosis, yaws, syphilis and other diseases. *See* Caries ; Inflammation ; Proud Flesh ; Scar.

GRAPE CURE. At Montreux, Vevey, Interlaken and other resorts, what is called the grape cure is taken for chronic constipation, corpulence, chronic bronchitis and other disorders. The cure consists in taking each day from 1 to 8 pounds of grapes freed from skins and stones.

GRAVEL. A sandy deposit of uric acid, oxalates, phosphates or other substances in the urine is described as gravel. This may happen for many years without giving rise to symptoms, but, on the other hand, there may be pain and straining after micturition and other signs of irritation of the bladder and passages. The exact nature of the gravel may be determined by microscopic examination and other tests, and dietetic and medicinal treatment be adopted according to the result. *See* Calculus ; Uric Acid ; Urine.

GREGORY'S POWDER. The compound rhubarb powder, commonly called Gregory's powder, contains light or heavy magnesia and ginger, in addition to rhubarb. It is used as a purgative in doses of 10 to 60 grains or 5 grains for a young child. It may be given in milk. A tiny pinch three times a day before meals acts as a stomachic.

GREY POWDER. The powder of mercury and chalk is usually referred to as grey powder. A dose of 1 grain is often useful in diarrhoea in young children. Grey powder has been extensively used in syphilis, 1 grain three or four times daily. *See* Mercury.

GRIPES. *See* Colic ; Flatulence ; Intussusception.

GROWING PAINS. The ordinary process of growth causes no pain, and what are called growing pains are really manifestations of acute rheumatism (q.v.) and should be treated as such. If neglected, serious implication of the heart may result.

GROWTH. At birth a child is usually about 20 inches long, and weighs about 7 pounds. This weight, which is doubled in 6 months, is trebled in 12, while the height has increased to about 28 inches. Thereafter growth is not so rapid, but by the end of the fifth year the original height at birth has been doubled, and by the end of the fourteenth it is about eleven-twelfths of the total to which the individual will attain. In the few years preceding puberty girls grow more rapidly than boys, but from about fourteen onwards boys make greater headway.

In the mechanism of growth the thyroid and pituitary glands take a prominent part. Thyroid insufficiency produces a shorter growth, while an increase in the contribution of the anterior lobe of the pituitary during the growing periods leads to giantism. Normal growth is dependent on a sufficient supply of food containing a requisite amount of vitamins, and on free exercise in the open air, though confinement in bed for some time may cause a young person to grow rapidly.

Life in the poverty-stricken areas of towns usually has the effect of stunting growth, though in many instances this may be due to rickets. Congenital syphilis and infantile diseases that interfere with digestion and assimilation tend to cause stunting. In some instances dwarfism is associated with kidney disorder. The term growth is often applied to a tumour (q.v.). *See* Baby; Child; Diet; Exercise; Heredity; Infantilism.

GUAIACOL. A colourless liquid which forms the active constituent of creosote, guaiacol was introduced as a remedy for consumption, and is often successful in relieving the cough, sweating, loss of appetite and other symptoms of this disease. It is best given in capsules, but may be given in cod-liver oil, in a mixture or in pills; it is sometimes used by inhalation. The dose is 1 to 5 minims.

Guaiacol carbonate is a white, tasteless powder with a dose of 5 to 15 grains. It may be used for consumption instead of guaiacol, and is generally the most useful drug for treating rheumatoid arthritis. For this complaint it is given in 10-grain doses in cachets three times a day for many months. *See* Creosote.

GUAIACUM. The heart-wood of two species of guaiacum trees, sometimes referred to as lignum vitae, or wood of life, and the resin of these trees, are both used in medicine, more particularly the resin. This is powdered, and given in doses of 5 to 15 grains. From it are prepared the official mixture of guaiacum, dose ½ to 1 ounce; ammoniated tincture, ½ to 1 drachm; lozenges, containing 3 grains each; and several unofficial preparations.

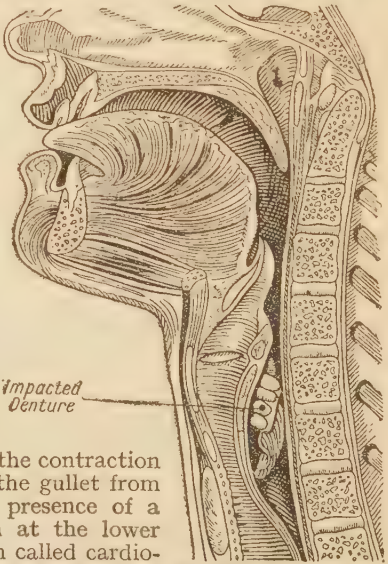
Guaiacum is an old remedy for chronic rheumatism and similar complaints, and is a constituent of the so-called "Chelsea pensioner" which can be asked for as the compound confection of guaiacum, B.P.C., and contains, in addition to guaiacum, sulphur, rhubarb and other drugs, the dose being a teaspoonful. Guaiacum may be taken for chronic pharyngitis.

Painful menstruation, or dysmenorrhoea (q.v.), may be prevented or relieved by the powdered resin, in 10-grain doses in cachets, or a corresponding dose of one of the liquid preparations, three times a day. The course of the drug should be begun seven to ten days before the period is expected.

GUINEA-WORM. On the Guinea coast of Africa and elsewhere in the tropics a parasitic roundworm, known as the guinea-worm, and scientifically as dracunculus or filaria medinensis may infest human beings, such infestation being described as dracontiasis. The female worm encysts under the skin of the back and legs, forming serious subcutaneous abscesses. The larval stage is passed in the cyclops, a minute crustacean, and is conveyed to man through the drinking of impure water. The larvae work their way into the human tissues and develop into adult worms. Afterwards the female bores her way to the skin, and having discharged all her embryos, begins to emerge. The exit of the worm is expedited by rolling up the free part on a match or quill each day. A doctor can hasten the cure by killing the worm by injecting into it a solution of perchloride of mercury, and then pulling it out. *See* Filaria; Worm.

GULLET. A muscular tube, lined with mucous membrane, and about 10 inches long, the gullet or oesophagus connects the lower end of the pharynx and the cardiac end of the stomach. It begins just behind the larynx and passes down the neck and thorax, piercing the diaphragm to join the stomach. In front of it in the neck is the windpipe, and on either side the great vessels and the vagus nerve; in the thorax it lies behind the heart.

Solid food passes down it by peristaltic movements, but liquids may be shot down quickly with little movement of the walls of the tube. Narrowing of the gullet, with resulting difficulty in swallowing, or dysphagia, may be brought about in various ways. It may be by a foreign body, by the contraction of scars following damage to the gullet from corrosive substances, by the presence of a cancerous tumour, by spasm at the lower end of the gullet, a condition called cardiospasm, or by pressure from the outside, say, of a goitre or an aneurysm of the aorta.



GULLET. Showing obstruction by a swallowed denture

An instrument for passing down the gullet and drawing out foreign bodies is called a probang (q.v.). It is sometimes necessary, however, in order to get the foreign body out, for example a denture fixed by its hooks, to open into the gullet from the neck, an operation called oesophagotomy. *See* Digestion; Larynx; Swallowing.

GUM. The dense mucous membrane covering the alveolar margin of the jaws and rising up to surround the roots of the teeth, is called the gum, or gingiva. Inflammation of the gum, or gingivitis, may be localised, as in the neighbourhood of a septic tooth, or occur as part of a general inflammation of the mouth, or stomatitis.

The most important disease of the gums from its frequency and its malign influence on the general health, is pyorrhoea; here pockets filled with pus are found in the gum surrounding the roots of the teeth.

The gums may be caused to bleed by the too vigorous use of a stiff toothbrush, but in scurvy and in mercurial poisoning they become soft and spongy, bleeding at the slightest touch. A fibrous tumour, known as a simple epulis, sometimes grows on the gum, or a myeloid sarcoma, which is called a malignant epulis. A common occurrence is a deep-seated inflammation and suppuration in the gum—an alveolar abscess or gum-boil; this is discussed under the heading Alveolus. *See* Epulis; Mouth; Pyorrhoea; Tooth.

GUM. The juice exuded by certain trees and shrubs and which is chemically related to starch and cellulose, is called a gum. When it dries the juice becomes sticky and then hardens, but may be dissolved in water or form a jelly. The gums mostly used in medicine are gum acacia and gum tragacanth (q.v.). They are used for suspending heavy powders in mixtures or external applications, and also for emulsifying fats and oils. Solutions of the gums are sometimes used as demulcents.

A solution of acacia with common salt, when injected into the blood, raises the blood pressure, and may be useful in shock and after a severe bleeding.

Gum benjamin is another name for benzoin (q.v.). *See* Resin.

GUM RASH. *See* Nettle-rash; Prickly Heat.

HAEMATOMA. A swelling caused by a collection of blood is called a haematoma and may occur in different parts, as under the skin, in the cellular tissue of the female pelvis or within the skull. At first a soft, or at any rate a fluctuant, swelling, it becomes harder when the blood clots. If suppuration does not take place the blood is generally absorbed, but thickening may persist for a long time, perhaps indefinitely. Bleeding may be lessened and pain relieved by cold applications.

HAEMOPTYSIS. The coughing up of blood is known technically as haemoptysis. There may simply be streaks or spots in the sputum or there may be considerable quantities of blood. Whenever haemoptysis occurs the possibility of its being due to consumption must be carefully considered. The vomiting of blood is termed haematemesis. *See* Bleeding; Consumption; Sputum; Vomiting.

HAEMORRHAGE. *See* Bleeding.

HAEMORRHOID. *See* Piles.

HAIR: ITS STRUCTURE AND HYGIENE

How to Stimulate the Growth and Preserve the Natural Gloss

After a description of the structure of a hair advice is given on the right methods of washing and brushing the hair and of dealing with bad conditions. For other information see the articles on Baldness; Beauty Culture; Dandruff; Depilatory; Electrolysis

A hair grows from a little pit, or follicle, in the skin, at the bottom of which is a little rounded elevation, supplied with blood vessels and nerves, on which the hair rears itself. The part of the hair within the follicle is called the root. A hair is a solid structure, contrary to the opinion of the barber, who suggests singeing as a means of closing the ends of " the tubes " opened by cutting the hair.

Into the follicle is poured the sebum, the oily secretion of one or more sebaceous glands to keep the hair soft and supple. Colour in hair is due to the presence of pigment cells. Attached to the follicle are tiny muscles, arrectores pilorum, which erect the follicle and with it the hair, a mechanism which also accounts for goose-skin. A hair grows about half an inch in a month, and is estimated to have an average life of 1,600 days.

Alopecia, or baldness (q.v.) may be due to various causes, the most common being seborrhoea, which is also the cause of dandruff (q.v.). Greyness of the hair is a usual result of advancing years, and is then due to atrophy of the pigment cells. This may occur also from general debility occasioned by an acute illness, anaemia, worry, and so on. Sudden blanching of the hair, which may occur from nervous shock, is due to the accumulation of immense numbers of air bubbles in individual hairs.

Beaded hair, or monilithrix, is a rare disorder in which spindle-shape swellings occur on the hairs at regular intervals from the root to the tip, a hair becoming very brittle in the intervals between the swellings. Most cases of the kind are congenital, but some are due to acute illness. Local stimulation of the scalp is the treatment.

In another disorder, trichorrhexis nodosa, at irregular intervals along the hairs whitish bead-like swellings occur, which, when magnified, are seen to be due to the hair breaking up into small fibres, the appearance being described as like that of two brushes put end to end. The hair on the face is usually affected, but the disease may also occur on the scalp in either sex. Various causes have been suggested, such as bacteria, general debility, and roughness in dressing the hair. Treatment depends upon the cause. It will probably be of use to keep the affected part shaved.

Care of the Hair. To keep it in good condition proper care is required for hair from earliest childhood. Five minutes' massage night and morning is excellent. It causes the blood to circulate more freely and brings the necessary nourishment to the hair follicles. It also loosens any dandruff, which is one of the worst enemies of the hair, and properly distributes the oily secretions. Massage with the cushions of the finger-tips, beginning by placing the fingers under the hair by the ears and with gentle pressure going over the whole scalp until it glows with the friction. Rub in such a manner that the scalp is moved and kneaded. This daily drill is more important than brushing.

The scalp should be kept scrupulously clean. If the follicles are blocked the escape of the sebum is prevented, and thus the hair is not only deprived of natural gloss, but the damming up of the secretion in the gland may cause pressure on the delicate hair root and permanently damage it. The head should therefore be washed regularly, and the hair dried properly afterwards. An infant's scalp requires washing daily and drying with great care. A child should have its head washed once a week, a man usually requires a shampoo as often, and a woman every ten days to three weeks.

To shampoo the head the scalp and hair should be thoroughly wetted, and then a good lather rubbed briskly on to the scalp with the tips of the fingers. Pure castile soap may be shaved and dissolved by pouring hot water over it. This is a suitable shampoo for young children, and for fair or white hair. Tar soap lather is recommended for dark hair. If the scalp is tender an egg shampoo is beneficial. The importance of complete rinsing cannot be too much stressed, and the final rinse should be with cold water. A little borax may be dissolved in the rinsing water. For fair hair the juice of a lemon may be added to the water for the penultimate rinsing.

After the thorough rinsing the hair should be dried with warmed towels. Artificial methods of drying hair, though difficult to avoid when time is a consideration, are not to be recommended, as they tend to make the hair brittle. A little brilliantine brushed through the hair after it is dry will improve its appearance and replace the natural oil temporarily removed by the shampoo.

The softest brush only should be used for a baby. Stiff-bristled brushes are good for strong crops of hair, but whalebone and wire brushes are seldom advisable. The hairbrush with bristles embedded in a rubber foundation is a comfortable and healthful type of brush to use for the average head of hair. Brushes should be kept perfectly clean, and each child or person should have his own brush.

For older children and adults, unless the hair is very brittle, a good brushing for five minutes at least once a day is beneficial.

The brush removes particles of scurf, stimulates the scalp, and so increases the blood supply to the hair roots and distributes the natural oil along the whole hair shaft. Brushing enhances the glossy appearance of the head.

Should hair of any shade have been allowed to get out of condition through illness or too much exposure to sun and sea winds, and the scalp be troubled with scurf, a special treatment is given. This is described under the heading Dandruff.

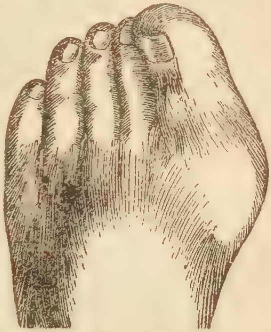
Any lotion or tonic treatment should be started just after the hair has been shampooed, and may be applied by means of a tiny sponge or cotton wool swab on the end of an orange stick, after the scalp has been thoroughly stimulated by massage. Tonics should be left off when the condition of the hair improves. Premature greyness of an hereditary nature seldom yields to treatment, but when due to dandruff, or some similar cause, may be corrected by the following pomade: Hydrochloride of pilocarpine, 2 grains; tincture of jaborandi, $\frac{1}{2}$ oz.; lanolin, $1\frac{1}{4}$ oz.; coconut oil, $1\frac{1}{4}$ oz. The value of most hair restorers depends to a great extent on the massage which is given prior to or during their application. The best contain ingredients which increase the flow of the blood to the scalp and thus stimulate growth.

Hair dyeing and tinting is best performed by experts, and henna dyes are usually the most satisfactory and also the safest to use. Some of the preparations sold for dyeing hair contain powerful irritants which may cause skin trouble involving not only the scalp but the face and neck. At a reliable hairdresser's an expert will experiment with a small portion of hair before applying such a dye over the whole scalp, in order to see if the customer is immune from possible bad results. Henna dyes for various shades of hair are sold with full instructions for use. If using any form of hair dye at home it is advisable to wear rubber gloves and protect the skin of face and neck by smearing them with vaseline before applying the dye. The troubles with dyed hair are that it is difficult to keep the scalp in good condition owing to the effect of oil and tonics on the colour, that the white hair growing at the roots shows fairly soon and requires frequent touching up, that it presents a hard and lustreless appearance and can rarely be successfully permanently waved.

Peroxide is useful for bleaching dark superfluous hairs on the face or arms, and rendering them less noticeable. Depilatory pastes will remove hairs, but they soon grow again. For strong, persistent growths of superfluous hair on the face either electrolysis or diathermy is often employed. It is essential to have such treatments performed by a good operator.

Hair with the slightest disposition to a natural wave should be encouraged by being set in combs after a shampoo. Straight hair when beautifully kept to give it a smooth sheen is becoming to women with well-shaped heads. Permanent waving solves many hairdressing problems. At the same time it is not a means of lessening proper care of the hair. Cheap permanent waving should not be risked. Where disappointment follows after permanent waving it is usually due to lack of experience on the part of the operator or to lack of subsequent care of the hair. If the scalp is dry the permanent wave will make it dryer. The hygiene of the hair, as described in the first part of this article, must be daily practised and foolish prejudices about disarranging the set of the waves by massage and brushing must be discarded.

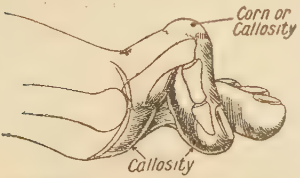
HALLUX VALGUS. A line prolonged forwards from the inner border of the heel ought to lie along the inner border of the great toe. Commonly, however, the toe is pushed away from this line towards the outer side of the foot, a deformity described as hallux valgus. The main cause is the boot or shoe with the pointed toe, as such is ordinarily constructed. Once the toe begins to be pushed out by the boot the tendons which move it tend to increase the deformity.



HALLUX VALGUS. Displacement of the great toe causing a bunion

The head of the metatarsal bone on which the great toe is jointed is thus exposed to pressure and to minimise this a bursa, or bag with a smooth lining, develops, on the inner side of the joint. Inflammation of this bag constitutes a bunion. The onset of hallux valgus ought to be prevented by fitting children with a shoe which has a straight inner border. Should a outward direction of the toe have been assumed, a suitable pad may be placed between the great toe and the next, so as to force the great toe inwards, or, in worse cases, a post may be fitted into the boot. *See* Bursitis ; Foot.

HAMMER TOE. In the deformity called hammer toe the segment or phalanx of the toe which is next the body of the foot is bent sharply upwards, while the other two segments are bent downwards, the toe thus assuming the form of an inverted V. A corn tends to form over the apex of the V, and also where the point of the toe touches the ground.

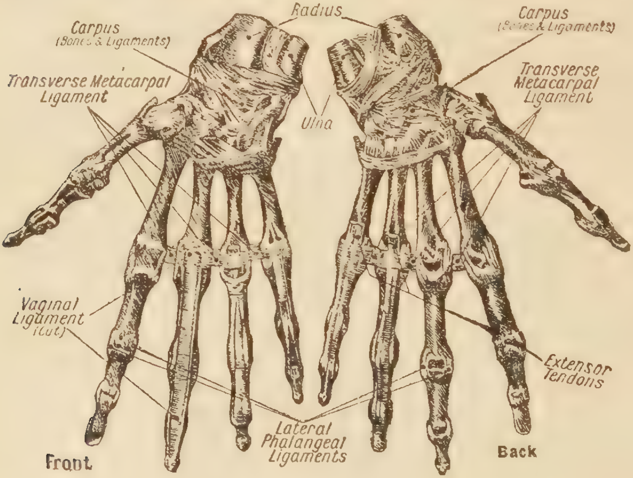


HAMMER TOE. Deformity which leads to the formation of corns

Hammer toe is caused chiefly by a badly shaped boot, one that is too short or too pointed. The position of the toe can sometimes be rectified by wearing a splint on the under surface of the toe, but a little operation is the more satisfactory method of treatment. *See* Claw Foot ; Foot.

HAND. There are three regions in the hand, the carpus or wrist, the metacarpus or body of the hand, and the fingers. There are eight carpal bones, disposed in two rows, from within outwards, those on the upper row being the cuneiform, on the front of which is the pisiform, the semilunar and the scaphoid, and on the lower row the unciform, the os magnum, the trapezoid and the trapezium. The five metacarpal bones are relatively long and have their shafts bent somewhat backwards. The bones of the fingers, of which there are fourteen, and other relative matters, are described under the heading Finger.

The skin of the palm, like that of the sole of the foot, is relatively thick, freely supplied with sweat glands and always devoid of hairs. Beneath the skin there is the palmar fascia, with extensions to the fingers. Thickening of this fascia is responsible for Dupuytren's contraction (q.v.). The skin is attached to the palmar fascia, and the various lines on the palm, to which a prophetic significance is given by the superstitious, are really the product of this attachment working in conjunction with the habitual movements of the hand.


Carpus
(Bones & Ligaments)
Radius
Carpus
(Bones & Ligaments)
Transverse Metacarpal Ligament
Transverse Metacarpal Ligament
Ulna
Vaginal Ligament (Cut)
Extensor Tendons
Lateral Phalangeal Ligaments
Front
Back

HAND. Bones and ligaments seen from front and back. The metacarpal ligaments prevent the fingers from separating beyond a certain point

Blood is supplied to the hand by the radial and ulnar arteries. The principal veins of the forearm, the cephalic and basilic, have their root in the veins on the dorsum of the hand. Sensation is supplied to the inner half of the hand, back and front, by the ulnar nerve, and to the outer or thumb half by the median nerve in front and the radial nerve behind.

The use of the right hand for manipulations requiring dexterity and delicacy is the rule, but a considerable number of children are left-handed. Some of these quickly and easily learn the use of the right hand for such purposes as writing, and become ambidextrous. As so much machinery is constructed for manipulation with the right hand, an earnest endeavour should be made to teach a left-handed child to use the right for work requiring precision, and writing is probably the best preliminary exercise for this purpose. Patience and understanding are necessary qualities in the teacher; when a left-handed child is trained with other children the sense of his peculiarity has a disturbing influence on him, and the comments of other children are usually the reverse of helpful, so that nervousness and stammering may readily develop.

CARE OF THE HANDS.—Well-shaped, supple hands with long, smoothly jointed fingers, nicely kept nails, and skin which retains its softness and whiteness of tint in all weathers are a rare but important point of beauty culture. Much can be done to improve appearance and render defects less noticeable, but it is the constant everyday attention which counts.

A pure toilet soap should be used to cleanse the hands. A night treatment is started by washing and kneading them well in the soapy lather, drying on a soft towel, care being taken to press down the cuticle of each nail in turn, massaging a hand balm into the skin and leaving a liberal allowance of the emollient on the backs of the hands, to be protected during the night by a pair of loose wash-leather gloves from which the tips of the fingers have been cut. A little glycerin jelly may be massaged into the hands on other nights, or a bleaching lotion made of 4 oz. rose water and ½ oz. each of hydrogen peroxide and strained lemon juice may be used when it is desirable to reduce redness or tan from exposure, or freckles.

Great care should be taken, especially in cold weather, thoroughly to dry hands which are liable to roughness. A little fine oatmeal rubbed over the skin after drying absorbs any moisture. Loose gloves should be worn when doing rough work, and after laundry or washing up glycerin jelly should always be applied. Stains are best removed by pumice-stone, which is also helpful for rubbing down hard skin on the finger-tips or palms of the hands. Lemon juice is of constant use. Half a cut lemon should always be kept on the wash-hand stand or by the sink. Rubbed over the hands and washed off with cold water, lemon juice tightens up wrinkled skin and removes dirt from nails when each finger-tip is thrust into the pulp in turn, and then the nail is carefully cleaned by means of an orange stick, its point wrapped in a shred of cotton wool.

A weekly manicure is desirable. The nails should first be filed and then nicely shaped by means of an emery board, cleaned and the cuticle pressed back with an orange stick dipped in peroxide of hydrogen. The hands are then washed and rubbed over with lemon juice, loose pieces of cuticle being removed with cuticle scissors after drying. The quickest method of polishing the nails is to paint them with simple tincture of benzoin, using a small camel-hair brush and allowing the tincture to dry on, but a liquid enamel or paste and nail powder may be used if preferred. A little greaseless vanishing cream is then massaged thoroughly into the hands, working upwards from wrists to fingers. *See* Finger; Nail; Whitlow; Wrist.

HARE-LIP. In the development of the face in the embryo a portion grows forward from either side until it reaches the middle line, where it unites with its fellow, but ordinarily a broad, shallow groove marks the line of union in the upper lip. In some children union does not take place and this maldevelopment is termed hare-lip. The gap may include the whole lip or only part of it, and in some instances besides hare-lip there may be a cleft palate.

Hare-lip is very disfiguring, but besides this it may seriously interfere with suckling. It is therefore necessary to remedy the condition as far as possible by operation, and this may be done on an ordinarily sturdy infant at from six weeks to three months. *See* Cleft Palate.

HARTSHORN. Ammonia was at one time extracted from the horns of the hart or stag and was called spirit of hartshorn. The liniment of hartshorn and oil consists of ammonia solution and olive and almond oils. *See* Ammonia.

HARVEST MITE. Also known as the harvester, the harvest bug, the mower's mite and the bête rouge, the harvest mite is a minute creature which infests the skin of human beings and domestic and wild animals in late summer and early autumn. It has a bright, scarlet colour but is too small to be readily seen with the naked eye. It causes papules or wheals on the skin and intense itching and irritation, and with the added effects of scratching this may result in dermatitis.

Petrol or benzine will kill the mite but, on account of their inflammability, these substances must be used with caution. An ointment of white precipitate ointment, one part, and soft paraffin, two parts, or sulphur ointment, will also be effective. Afterwards it may be necessary to use soothing remedies, such as zinc ointment, to clear up dermatitis.

HAY FEVER. Also known as autumnal catarrh, hay fever is a paroxysmal disorder in which the eyes and nose are hot and perhaps itchy and discharge a clear mucous secretion, more or less freely. Sneezing is often troublesome and breathing may be difficult, perhaps to the extent of definite asthmatic seizures. The usual exciting cause is grass pollen, especially that of Timothy grass. The susceptibility to react to the pollen is largely inherited, and may be accompanied by a tendency to nettle rash.

The pollen responsible may be determined by noting the reaction of an individual to extracts of various pollens, and when this is done the degree of susceptibility to the particular pollen is tested. This information is got by dropping solutions of pollens into the eye. An attempt is then made to build up the resistance of the patient to the noxious pollen by a series of injections of pollen-extract, the initial dose depending on the patient's susceptibility as decided by the preliminary tests. The injections should begin not later than the end of March.

If a patient has not had the advantage of this treatment residence in town is desirable during the pollen season, and at night wet sheets should be hung in front of the bed-room window to obstruct the entrance of pollen.

Should attacks occur, local sedatives, such as chloretone, may be helpful, and for asthmatic attacks the treatment suggested under the heading Asthma.

HEADACHE. The cause of headache may not be far to seek, as when it occurs as a symptom of fever, acute indigestion, acute nephritis or some other well-marked disorder. Again, when attacks of headache occur, limited to one side, and accompanied by vomiting and certain other symptoms, the existence of sick-headache, or migraine (q.v.) is obvious.

Often, however, there may be no obvious evidence of general or local disturbance, or concurrent symptoms may be misleading unless skilfully interpreted. Thus, headache accompanied by vomiting may suggest a stomach disorder although actually due, for example, to a brain tumour, to eye trouble, or to kidney disease.

When headaches are frequent the health requires to be carefully overhauled in at least three directions: (1) any possible source of irritation in the eyes, nose, teeth or ears; (2) any source of poisoning such as constipation, chronic Bright's disease, pyorrhoea, chronic appendicitis, or, in women, disease of the pelvic organs; (3) any general weakness, such as anaemia or neurasthenia.

Pain at the root of the nose or in or about the eyes suggests disorder in these organs respectively; a sensation of a tight band round the head, neurasthenia; and a severe, boring pain on the top of the head suggests the clavus of hysteria. Often, however, the situation of the pain is no guide. Headache which is only present at night, or is worse then, is suggestive of syphilis.

Headache cannot be treated properly unless its cause, or causes, is determined. Immediate relief may be obtained in various ways as, for example, by putting cold cloths on the forehead or rubbing it over with a menthol cone, or by putting a mustard plaster on the nape of the neck. If there is indigestion or constipation a purge is necessary.

As regards headache powders, pills or potions, it is important to know what one is taking, because secret headache remedies have been found to contain acetanilide, a drug which may cause serious depression. A useful powder contains 7 grains of phenacetin and 2 grains of caffeine citrate. Aspirin, in 10-grain doses, often gives relief, especially in subjects of rheumatism. *See* Caffeine; Change of Life; Fever; Indigestion; Migraine; Neuralgia; Neurasthenia; Teeth.

HEALTH. In general terms health may be defined as the condition in which all the bodily functions, even in the ordinary emergencies of everyday life, are carried out comfortably. The more natural our conditions of life, the more likely is a state of health to be maintained. For much disease our excesses are to blame; for example, in the use of alcohol or tobacco.

Many serious disorders begin in an insidious fashion, causing little depreciation of that comfortableness in the process of living which it has been said is indicative of health. A due regard to such slight depreciation is very important, therefore, as appropriate treatment may prevent the development of serious disorders, or at the worst delay their progress. This consideration becomes all the more important when one has passed middle-life.

The wrong way to deal with such slight symptoms, however, is to adopt a fidgety concern with regard to them but do nothing more. If they cannot be removed by simple means which suggest themselves to anyone, a doctor should be consulted. *See* Diet; Exercise; Mental Hygiene; Ventilation.

HEARING. Waves of air, or some other medium, set in motion by the vibration of some object, are enabled by the mechanism described under the heading Ear to cause impulses to pass along the auditory nerve to the brain, and so give rise to the sensation of hearing. The greater the rapidity of the vibrations the higher the pitch of the sound, but only vibrations between about 30 and 15,000 can be appreciated by the human ear, those used in music ranging from 40 to 4,800.

The power of hearing may be ascertained by observing at what distance a person can hear the ordinary conversational voice, a whisper, the ticking of a watch or the vibrations of a tuning-fork. The sense of relative pitch may be determined by the use of Galton's whistle. It is important to find out the power of hearing by air conduction, by holding the vibrating prongs of a tuning-fork near the ear-hole, and also the bone conduction, by placing the end of the stem of the fork on the mastoid process behind the ear. A comparison of the two is called Rinné's test. Normally the fork should be heard longer by air conduction, but in what is called obstructive deafness, say from outer or middle-ear disease, the bone conduction is better than the air. In applying any test to one ear the other must always be covered over. If the end of the stem of the fork is placed on the top of the head of a person with obstructive deafness in one ear, the sound is loudest in the bad ear. This is called Weber's test. These tests are illustrated in Plate 21. *See* Deafness; Ear.

HEART AND HEART DISEASES

The Wonderful Self-Regulating Human Pump

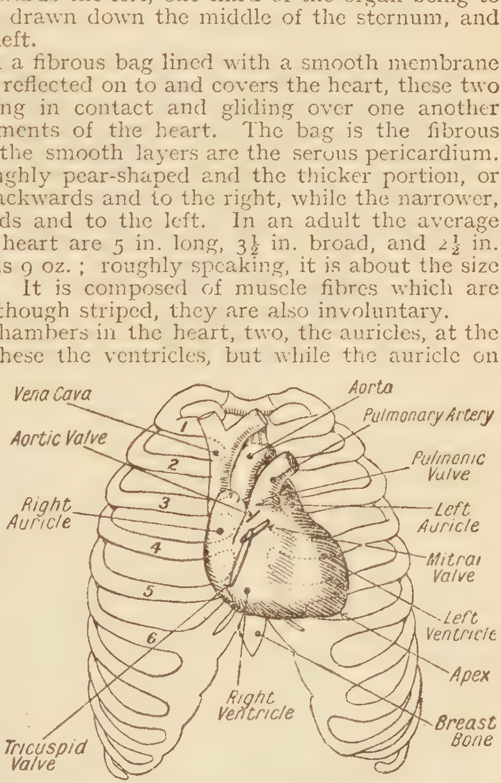
In the following pages the mechanism is described of the pump by which nourishment is distributed to all the tissues of the body. An account is also given of some of the disorders, functional and organic, which may affect its operation and impair its delicate rhythm. See Angina Pectoris; Artery; Blood; Circulation of the Blood: Embolism; Endocarditis; Pulse; Vein, etc.

The main factor in the circulation of the blood, the heart, is situated between the lungs and rests on the diaphragm. It lies behind the breast bone, or sternum, but extends on either side of it, especially towards the left, one-third of the organ being to the right of a line drawn down the middle of the sternum, and two-thirds to the left.

The heart lies in a fibrous bag lined with a smooth membrane which, however, is reflected on to and covers the heart, these two smooth layers being in contact and gliding over one another during the movements of the heart. The bag is the fibrous pericardium, and the smooth layers are the serous pericardium.

The heart is roughly pear-shaped and the thicker portion, or base, is directed backwards and to the right, while the narrower, or apex, is forwards and to the left. In an adult the average dimensions of the heart are 5 in. long, $3\frac{1}{2}$ in. broad, and $2\frac{1}{2}$ in. thick. and it weighs 9 oz.; roughly speaking, it is about the size of the closed fist. It is composed of muscle fibres which are peculiar in that although striped, they are also involuntary.

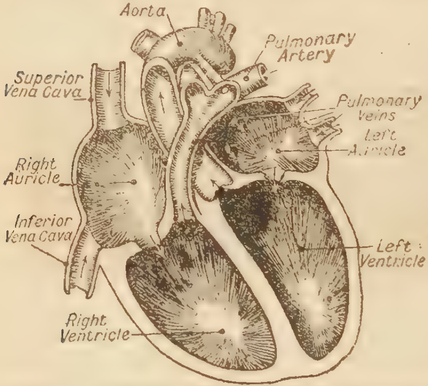
There are four chambers in the heart, two, the auricles, at the base, and below these the ventricles, but while the auricle on each side communicates with the corresponding ventricle, there is no communication within the heart between the auricles or between the ventricles, so that one can speak of the right heart and the left heart, each consisting of an auricle and a ventricle.



HEART. Its position in relation to the ribs

The right auricle receives blood from the veins of the body through two large trunks, the superior and the inferior vena cava, and pumps it into the right ventricle, from which it is sent through the pulmonary artery into the lungs; thence it is returned by four vessels, the pulmonary veins, into the left auricle, and from this into the left ventricle, which pumps it through the aorta and on through the arteries to all parts of the body. The pulmonary artery and the aorta emerge from the upper parts of the respective ventricle, so that all the great vessels are grouped about the base of the heart.

Blood is prevented from flowing in the contrary direction to that which has been just described, by the existence of valves between each auricle and ventricle, and at the orifice of the pulmonary artery and of the aorta. That between the right auricle and ventricle is called the tricuspid valve, because it has three main cusps, or flaps, while the corresponding valve on the left is the mitral, with two main cusps and an outline somewhat resembling a bishop's mitre, whence its name. A cusp of these valves consists of a thin layer of fibrous tissue covered on both sides by a smooth membrane, the endocardium, which also lines the cavities of the heart. When the valve is closed, the edges of the cusps overlap.



HEART. Diagrammatic section showing course of the blood from the auricles into the ventricles

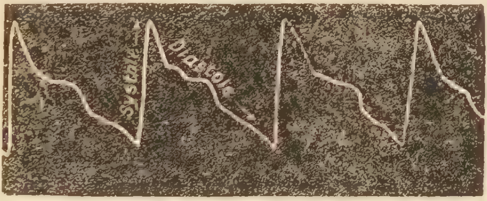
The aortic and pulmonary valves consist of three cusps in the form of little pockets, the openings of which face away from the ventricle, so that when blood attempts to pass back into the latter the pockets fill out and close the opening in the vessel which they guard. Each cusp has a half-moon shape, hence the valves are described as the semi-lunar valves.

Blood is propelled from each chamber by the contraction of its muscle-walls just as water would be expelled from a rubber ball containing it by the hand closing round and compressing the ball. When the muscle again relaxes, blood flows into the chamber which opens out or dilates. The contraction of the heart or any chambers of it is described as its systole, and relaxation as its diastole. In the action of the heart there is a regular cycle, and a chamber will be resting for a longer time than it is working. Its strength is thus continuously recuperated, so that it is enabled to go on beating night and day for a lifetime.

The blood in the right side of the heart is dark and venous, that in the left side bright scarlet, purified from carbonic acid gas and charged with oxygen for the use of the body tissues. It is estimated that each ventricle pumps out about three ounces of blood at each beat of the heart. The first branches of the aorta are the coronary arteries, those supplying the tissues of the heart itself, but they receive their blood during the resting period of the heart. Venous blood from these tissues is gathered into a large vein at the back of the heart, known as the coronary sinus, whence it flows into the right auricle.

Owing to the elasticity of the arteries, a wave of expansion, or pulsation, passes along them with each beat of the heart. This pulse is usually felt for on the radial artery at the wrist, and takes place here a fraction of a second after the heart beat.

In the wall of the right auricle, between the openings of the superior and inferior vena cava, there is a small particle of altered muscle, about the size of a grain of wheat, which is known as the sinu-auricular node. It originates the rhythmic impulses which control contraction of the auricles, and is often referred to as the pace-maker.



HEART. Curves of heart beats showing the two stages

The rate of the heart beat is also controlled by the nerves, however, impulses through the vagus nerves slowing it and others through sympathetic nerves quickening it and at the same time increasing its force.

When the ventricles contract, the apex of the heart is thrust against the chest wall on the left side, its impact being referred to as the apex beat.

If one listens over the beating heart two sounds are heard which rather resemble the sound of the words lubb-dup. The first occurs synchronously with the apex beat, and therefore in connexion with the contraction of the ventricles and the closure of their valves ; it is indeed caused by these things and especially by the valves closing. The second sound, which is shorter and sharper, represents the closure of the pulmonary and aortic valves when the blood which has been pumped into the vessels and has distended them presses backwards on the elastic recoil of their walls at the end of ventricular contraction.

Diseases of the Heart. Among the symptoms of heart disease there are some that occur without there being anything organically wrong with the organ ; the symptoms represent a mere functional disturbance, a condition which is sometimes described as disordered action of the heart, or, shortly, D.A.H. Shortness of breath on slight exertion, palpitation, pain over the heart, faintness, giddiness, and other symptoms may often be so interpreted. Such may follow an acute infectious disease, or arise independently, and particularly in persons of a neurasthenic type. In every case of this kind a search should be made for some source of bacterial toxaemia, at the roots of the teeth, in the nose, in the tonsils, in the appendix, and so on. Any focus of this kind should be thoroughly cleaned up, and beyond this, the treatment mainly consists in following hygienic rules of living. Worry over the heart itself is unnecessary, and does harm.

The most frequent cause of organic disease of the heart is acute rheumatism, which is possibly of streptococcal origin. The heart may become affected in the course of an attack of acute rheumatism with joint symptoms, or of chorea, or St. Vitus's Dance. In children the heart may be the sole organ affected in an attack of acute rheumatism, or there may be simply what are called growing pains, and still the heart may suffer. Implication of the heart may occur in tonsillitis, and it is not uncommon in scarlet fever. Other bacterial infections may also cause inflammation of the heart; syphilis is a not uncommon cause.

Disease of the heart may be induced by severe physical exertion, though sometimes there is also infection of the heart, probably made possible by overstrain of the organ. The effort of carrying on the circulation through arteries narrowed by chronic kidney disease or some other cause, may, in time, induce structural changes.

Fibrosis or some other abnormality may interfere with the conduction of impulses to the ventricles. This is known as heart block, and if the ventricle refrains from beating for more than a certain time, say 18 seconds, the patient becomes unconscious and probably has convulsions, this condition being known as the Stokes-Adams syndrome.

Sometimes parts of the heart wall may be unduly irritable, and give rise to a rapid action of the organ, perhaps in a long series of beats at the rate of 130 to 200 per minute, constituting attacks of what is called paroxysmal tachycardia, or that kind of irregularity of the pulse distinguished by premature contractions. These have no serious significance in sound hearts, though it may be otherwise if the heart is diseased. In some instances the auricles alone are affected, a condition called auricular flutter, contractions taking place at the rate of 200 or more per minute.

Disease of a valve may cause narrowing, or stenosis, so that the blood-flow through it is obstructed; or incompetence, so that blood flows back, or regurgitates into the chamber from which it has been pumped; both of these conditions may affect any one valve. In order to drive the blood through a stenosed valve or to deal with the excess of blood caused by regurgitation, the muscle-wall of the chamber affected must thicken, or hypertrophy, in order to acquire greater power. When this happens, compensation is said to have occurred.

In the course of time compensation does fail, but it may do so at any time from over-stress or from some illness that weakens the muscle. In the early stages of failure, symptoms of back pressure appear, and they become progressively more extensive and severe. In aortic regurgitation, the other common form of valvular disease, failure of compensation of the left ventricle leads to regurgitation of blood through the mitral valve, and to the same back-pressure phenomena.

In advanced cases of mitral stenosis or in degeneration of the cardiac muscle, a form of heart failure occurs which is called auricular fibrillation. The auricles cease from contracting regularly, but tumultuous, irregular contractions take place in individual muscle fibres in their walls. The stimuli sent to the ventricles are correspondingly uneven, and consequently the pulse, which reflects their contractions, is utterly irregular.

One important sign of valvular disease is a murmur, a new sound heard when listening over the heart, and which may accompany the normal heart sound. Another sign of heart disease is enlargement of the organ. This may mean dilatation merely, or the heart may be hypertrophied, and then the apex beat may be forcible and heaving. Great enlargement may occur, especially in aortic regurgitation. Enlargement caused by great physical exertion is sometimes referred to as athlete's heart.

In aortic regurgitation some of the blood pumped into the arteries flows back into the left ventricle, so that the distension of the vessels is weakly sustained, and they collapse at once, after the heart beat. This produces what is called the water-hammer, or Corrigan's, pulse, best felt at the wrist when the arm is raised above the head.

Valvular disease is caused by endocarditis (q.v.) mainly, and mitral stenosis and aortic regurgitation are the commonest lesions, though mitral regurgitation and aortic stenosis also occur, and, more rarely, similar lesions to all of these on the right side of the heart. More than one valve may be affected.

The treatment of heart disease can only be safely and satisfactorily carried out under medical guidance.

Prevention of heart disease is largely bound up with that of acute rheumatism, but something would be done in this direction were parents fully alive to the possibility of rheumatic inflammation of the heart occurring in connexion with "growing pains," with tonsilitis or with St Vitus's dance. Other instances would be avoided were all syphilis cases given early treatment.

A person whose heart is damaged must live carefully, punctiliously observing the rules of personal hygiene. Constipation, indigestion or anaemia should be corrected. The mouth should be kept scrupulously clean, and an attempt should be made to clean up sepsis there or elsewhere in the body. Medical advice should be taken on the use of tobacco and alcohol.

Over-exertion should be avoided ; a young person with a damaged heart should choose an occupation which will not subject him to anything of this kind ; persons who are engaged in manual labour should live as near their place of occupation as possible, as a long walk may be too much for them in addition to the exertion involved in the occupation. Rest in bed for a day or two each week may allow work to be done in comfort which would be impossible otherwise.

On the other hand, unless he has had orders to the contrary, a person suffering from heart disease should take regular exercise should his employment be a sedentary one, keeping him indoors. Easy walking, or games which do not put one out of breath, should be enjoyed. Exercise flushes the muscles with nourishing blood, and clears out waste products from them. The same results can be achieved by massage, and this is a useful measure, particularly for a patient confined to bed.

The drug most often used in heart disease is digitalis, amongst others being opium, strophanthus, quinidine and general tonics. In expert hands quinidine may be very successful in restoring the heart from the condition of auricular fibrillation.

HEARTBURN. *See* Acidity ; Indigestion.

HEAT STROKE. Exposure to excessive heat may cause heat stroke, a condition having some resemblance to an apoplectic seizure. When following exposure to the rays of the sun the condition is described as sunstroke, or insolation, but exposure to the sun is not the only way in which heat stroke may be caused ; it may occur in stokers and others similarly placed. Its occurrence is favoured by alcoholic habits, inability to sweat freely, by too heavy clothing, and by exposure of the head and neck to the sun.

The patient may suddenly fall unconscious or there may be preliminary symptoms, such as headache, giddiness, vomiting, and sickness. Usually the face is flushed, the pupils very small, the pulse bounding, and the breathing stertorous. The skin feels burning, and if the temperature of the body is taken it will be found to be very high, perhaps 107° to 110° F.

The immediate treatment for heat stroke is to take the patient into the shade, or the coolest place available, strip the clothing from the trunk, and souse the trunk and head with cold water. As soon as possible he should be taken home or to a hospital, where an effort will be made to lower the temperature by rubbing him over with ice or giving an iced pack or bath, and possibly an iced enema. *See* Fever.

HEMIPLEGIA. Paralysis of one side of the body is called hemiplegia. *See* Paralysis.

HENBANE. The leaves of henbane, or hyoscyamus, contain the alkaloids hyoscyamine, hyoscine and atropine, and are used to make various medicinal preparations, including the following official ones : extract, dose 2 to 8 grains ; tincture, dose $\frac{1}{2}$ to 1 drachm ; and hyoscyamine sulphate, dose $\frac{1}{200}$ to $\frac{1}{100}$ grain. The action of hyoscyamus resembles that of belladonna (q.v.). The leaves are sometimes used in making fumigatory powders or cigarettes for the treatment of asthma.

HEREDITY. Every species of creature has been developed from a preceding type from which it differs in some degree, while differing very profoundly from an ancestor far back in the chain of descent. The characters of a species must, therefore, have been caused by modification, but such would not have availed in the production of new species unless the characters of progenitors were transmitted to the progeny.

That such happens, however, is common knowledge; a family likeness is stamped on creatures having a common descent and extends to peculiarities which can be ranked as abnormalities. Thus, for example, successive generations of human beings may have an excessive number, or on the other hand a deficiency, of fingers and toes; or a coarse, scaly condition of the skin known as ichthyosis, or the fish-skin disease. The peculiarity which is inherited may be of a more subtle character, such as the peculiar make-up of the blood in haemophilia, or the bleeder's disease, colour blindness, deaf-mutism, gout, etc.

The inheritance of a character not exhibited by the immediate ancestors, but by one more remote, is described as atavism. It is sometimes asserted that a normal person who has become mentally deranged from alcoholism can transmit his insanity to his progeny. This implies the possibility of the inheritance of an acquired character. Weismann declared such a thing impossible on the ground that the germ plasm out of which new individuals are developed is itself completely and finally differentiated from the rest of the body at birth, and so could not be given new characters during the lifetime of the individual in whose body it was, but could merely be handed on as a sexual cell to start a new generation.

The explanation of insanity in the progeny following alcoholism in the parent is that the want of control in the latter is itself due to mental defect which exhibits itself in lack of moral control in one generation and in another by a more patent mental disorder. Tuberculosis may be inherited in the sense that a soil peculiarly susceptible to the growth of the tubercle bacillus is transmitted, but of much greater importance in the genesis of this disease is the opportunity for the infection of young children who are living with consumptive parents, or who drink tuberculous cows' milk. Whenever it is possible for a child to have inherited a disease, the greatest care should be taken so to adjust its life that things likely to evoke the symptoms of the disorder, or aggravate them should be eliminated as far as possible.

HERNIA. The protrusion of an organ through the wall of the cavity in which it is contained is called a hernia. There are three naturally weak spots in the anterior abdominal wall through which a hernia, or rupture, may occur. These are the umbilicus, or navel; the crural canal, a short passage about an inch long lying on the inner side of the femoral vessels; and the inguinal canal in the groin.

A weak scar on the abdominal wall, following an operation for appendicitis for instance, will probably be the site of a ventral hernia. The organ protruded in an abdominal hernia is usually a loop of bowel, but it may be a piece of omentum, the bladder, an ovary, or some other organ. Whatever is protruded derives coverings from the peritoneum lining the abdomen and from the other layers of the wall, all together forming what is called the sac of the hernia.

From imperfection at the navel a hernia here may be congenital, and this may happen also in the inguinal canal from the non-closure of the processus vaginalis, the protrusion of peritoneum, in shape resembling the finger of a glove, which accompanies the testicle in its descent into the scrotum.

A rupture is usually accompanied by pain, and there may be also a feeling of weakness in the part and perhaps symptoms of indigestion. A lump appears, but this can usually be reduced, or caused to disappear. An irreducible hernia is one that cannot be returned into the abdomen by ordinary manipulation. Sometimes the sac and perhaps also the contents become inflamed following on some injury, and there is a probability that adhesions will be left by the inflammation and prevent the hernia from being reduced. A more serious risk is that of strangulation from the neck of the hernia being nipped or compressed, so interfering with the blood supply, and in the case of the bowel, the passage of its contents. This causes severe pain, shock and probably vomiting, the symptoms in fact of obstruction (q.v.) of the bowels.

In infancy a hernia can generally be cured by wearing a truss (q.v.); the same treatment should be adopted for elderly people, or when, owing to some other disease, an operation is out of the question; otherwise treatment by operation, or what is known as the radical cure, is to be recommended. Should any difficulty in reducing a hernia occur, the matter may be simplified if the patient lies on his back and bends his thighs. The greatest gentleness must be used in handling the hernia.

Hot applications should not be used for pain, which may occur at this time, but iced cloths, or an ice-bag, if left on for some minutes, will not only diminish suffering, but may facilitate the reduction of the hernia. A doctor should always be called, however, and if there is any sign of strangulation, an immediate operation is necessary. *See* Abdominal Belt; Truss.

HERPES. The blisters that sometimes form about the margin of the mouth in those suffering from a common cold, pneumonia, and other disorders, are called febrile herpes, the term herpes being applied to clusters of blisters or vesicles forming on reddened skin or mucous membrane. These are examples of simple herpes, and are treated by soothing applications, such as zinc ointment or calamine lotion, and perhaps by giving quinine sulphate, ¼ to 1 grain thrice daily.

In a more serious disorder, known as herpes zoster, zona or shingles, the blisters form along the course of a sensory nerve, 'most frequently an intercostal nerve. There may first be smarting pain along the nerve, suggesting pleurisy or some other deep-seated disorder, and then patches of reddened skin appear on which clusters of vesicles form, the contents of which are at first clear, but become turbid. In about a fortnight they have dried up. There is considerable pain throughout.

A person who suffers from herpes zoster will very often be found to have been in contact with one suffering from chicken-pox, and possibly the causative germ may be the same.

Before the blisters have ruptured the patches may be painted with collodion ; otherwise sedative and antiseptic ointments or lotions are applied. Aspirin is given in 10-grain doses to relieve pain ; opiates are sometimes needed, however. Intramuscular injections of the patient's own blood may be of great service.

HEXAMINE. Formerly called urotropine, hexamine is an efficient urinary antiseptic when given in doses of 5 to 15 grains, but can only act in an acid urine. If, therefore, the urine is alkaline, 15 to 30 grains of the acid phosphate of sodium is given with each dose of hexamine.

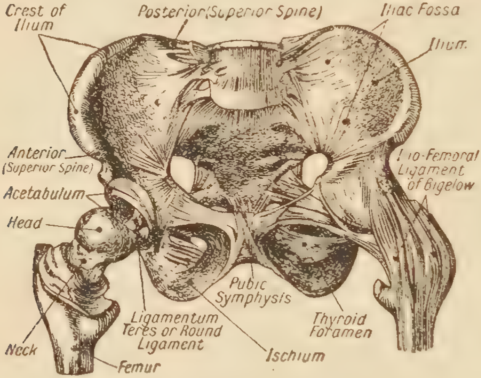
HICCOUGH. Hiccough can usually be cured by such simple expedients as holding the breath as long as possible, drinking from the far side of a glass while stooping forward and hold the breath, holding the arms above the head until tired, putting a pinch of salt on the back of the tongue or by a dose of bicarbonate of soda, bismuth carbonate or rhubarb and magnesia. Persistent hiccough is sometimes a symptom of encephalitis lethargica (q.v.).

HIP. The part of the thigh just below the buttock is described as the hip. The hip joint is a ball and socket joint, and is formed by the rounded head of the femur (q.v.), sinking into the cup-shaped depression on the side of the haunch, or innominate, bone.

The joint is surrounded by a capsular ligament which encloses the neck of the femur wholly in front, but only for about half its length behind. The capsule is strengthened by various bands, a very important one being the ilio-femoral ligament, or Y-shaped ligament of Bigelow, which is situated in front and owes the second of these names to the fact that as it passes to be attached to the femur it divides into two diverging limbs. Besides these external ligaments there is another, the ligamentum teres, a round ligament, which is attached to the head of the femur and to the bottom of the acetabular cup. Although its range of movement is less than that of the shoulder joint, the hip joint permits movement in all directions.

In a dislocation of the hip the head of the bone may travel backwards and upwards, backwards and downwards, forwards and upwards, or forwards and downwards. Dislocation occurs usually in young vigorous men, as in elderly people violence tending to dislocate would probably fracture the neck of the femur. In an affection of the hip known as a congenital dislocation, the head of the femur may never have occupied the acetabulum. Up to five or six years of age a cure may be effected by what is called the bloodless method of Lorenz. The limb is abducted, with the head of the bone pressed into the acetabulum and kept in this position by plaster of Paris. In older children a cutting operation is usually required.

By hip disease is meant tuberculous arthritis of the joint, although the hip may be the site of synovitis and arthritis from other causes. Hip disease practically always begins in childhood. A child begins to limp, and on examination it is found that the joint is stiff, the muscles around it being contracted in order to prevent movement and consequent pain.


Crest of Ilium
Posterior (Superior Spine)
Iliac Fossa
Ilium
Anterior (Superior Spine)
Acetabulum
Head
Ilio-Femoral Ligament of Bigelow
Pubic Symphysis
Ligamentum Teres or Round Ligament
Thyroid Foramen
Neck
Femur
Ischium

HIP. Ball and socket joint and its ligaments

Until pain and other acute signs have moderated, and malposition is rectified, the patient is kept at rest in bed with the limb extended, but afterwards a Thomas' hip splint is applied to fix the joint, and the patient is allowed to get about in the open air with the help of crutches. The general treatment for tuberculosis (q.v.) is as necessary as local treatment. *See* Dislocation; Femur; Fracture; Joint.

HODGKIN'S DISEASE. The salient features of Hodgkin's disease, also called pseudo-leukaemia and general lymphadenoma, are a progressive enlargement of lymphatic glands all over the body, and a progressive anaemia. The disease, which is not a common one, is oftenest found in young males. The cause is not clear, though many think that it is due to tubercular infection.

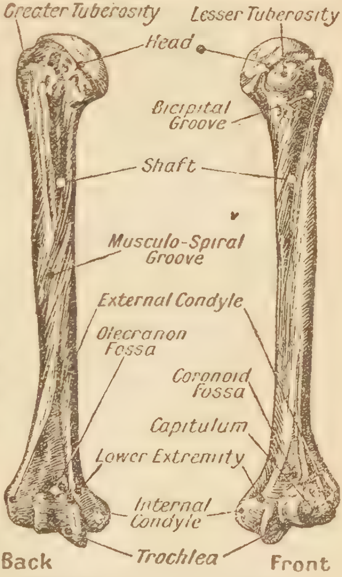
The glands of the neck are usually the first to enlarge, and no others may be affected for several years. At some time, however, those in the armpits and groins are affected, besides other superficial glands and deep glands, including those in the chest and abdomen, the growth of which may press upon important organs and structures. The spleen also enlarges. The red blood cells are diminished to about 50 per cent, and the haemoglobin in the cells to about 40 per cent. There is more or less fever, and sometimes ague-like attacks. As time goes on general dropsy usually supervenes. Arsenic is the only drug which has any curative effect. *See* Lymphatic System.

HOOKWORM DISEASE. *See* Ankylostomiasis.

HOUSEMAID'S KNEE. *See* Bursitis; Knee.

HUMERUS. The bone of the arm, or humerus, has an upper extremity, a body or shaft, and a lower extremity. The upper extremity consists of a smooth, rounded articular surface, a prominence called the greater tuberosity on the outer side, and another, the lesser tuberosity, in front. Between the tuberosities, which serve for the attachment of muscles, is a well-marked groove for the long head of the biceps muscle.

The shaft is cylindrical in shape above but prismatic below. A shallow groove passing outwards and downwards on the posterior surface is known as the musculo-spiral or radial groove, as it is occupied by the nerve called by either of these names. This nerve may readily be injured in fractures through the shaft. The lower extremity of the bone is widened out into two prominences, the internal and the external condyle, which, with the ridges above them, give attachment to muscles of the forearm (q.v.). *See* Arm; Elbow; Fracture.



HUMERUS. Bone of the upper arm

HUMIDITY. The amount of water-vapour present in air, or its humidity, has an important bearing on health. The amount of water-vapour which can be taken up by the air depends on the temperature of the latter; the higher this is the greater the amount of water-vapour, but at any temperature there is a saturation point, and if the air is then cooled water-vapour is forced out in the form of dew or of rain. Humidity is tested by various kinds of instruments, and the most agreeable amount for healthy persons in temperate climates is about 75 per cent of saturation. Great humidity lessens evaporation of perspiration from the skin and causes depression of vitality. *See* Air; Damp.

HUMP-BACK. *See* Backbone; Pott's Disease.

HYDATID DISEASE. In the liver and certain other organs of the human body, cysts containing a watery fluid may develop in connexion with the presence of the immature form of a flatworm, known as the taenia echinococcus. These hydatid cysts, as they are called, may attain a great size, specimens having been found to weigh as much as 30 pounds. Unless it presses on some important structure, a cyst, even though large, interferes little with health. It may rupture, however, and if this should be into the peritoneal cavity, a fatal peritonitis will supervene.

The mature worm is a tiny creature, about ⅛th of an inch long, which inhabits the intestine of a dog or some allied animal. The eggs are passed in the excreta of the animal and may pollute water or fresh vegetables which are consumed by a human being. It has been proved, also, that hydatid infestation may occur from kissing a dog.

Hydatid disease is more prevalent in Australia and some other countries than in Great Britain, but as it may occur here, precautions must be taken against the risk of consuming water or vegetables, especially cress, contaminated with the eggs of the parasite. Should the existence of a cyst be recognized it should be removed by operation. *See* Worm.

HYDRAGOGUE. Substances that drive water from the body are described as hydragogues. Croton oil, elaterium and jalap are examples of purgatives which are classed as hydragogues. Water may also be removed by giving diuretics to increase the amount of urine and diaphoretics to increase that of the sweat.

HYDRASTIS. The rhizome of golden seal, hydrastis canadensis, contains an alkaloid, hydrastine, which is bitter and constricts blood vessels. On account of its latter action the drug is sometimes used to check bleeding, especially that from the womb. Because it is bitter it is also sometimes used as a stomachic. It has a reputation in the treatment of chronic alcoholic gastritis when liquor has been given up.

HYDROCELE. The testicle is covered by a double layer of smooth membrane which forms a closed sac and is known as the tunica vaginalis. An accumulation of clear fluid in this sac is called a hydrocele, and exists as an elastic swelling in front of the testicle. An acute hydrocele accompanies acute inflammation of the testicle, but is usually of small size. A chronic hydrocele is common with a late syphilitic affection of the testicle. Usually, however, a hydrocele occurs from causes not properly understood, except that the testicle appears to be normal. This kind chiefly affects middle-aged men.

A common method of treating an ordinary hydrocele is to tap it at intervals of a few months. This little operation causes but slight discomfort, as a rule; a suspensory bandage should be worn in the intervals. If, however, the patient wishes to avoid this repetition of tapping, he may submit himself to curative treatment. The best method is to cut the sac away.

If the fluid from a hydrocele is milky, the condition is called chylous hydrocele. In tropical countries this is likely to be due to filariasis. *See* Filaria; Testicle.

HYDROCEPHALUS. An excess of cerebro-spinal fluid in the skull, constituting hydrocephalus, or, as it is popularly called, water on the brain, is usually due to inefficient drainage of the fluid; otherwise it is caused by excess in production. The fluid, which is derived from cells covering the choroid plexus of veins, normally passes into the ventricles or spaces within the brain, and flows backwards to the 4th ventricle, through openings in the roof of which it reaches the space beneath the arachnoid or middle covering of the brain. From this space it is drained off mainly by the large venous sinuses of the skull.

Hydrocephalus may exist at birth owing to maldevelopment of the parts concerned, or come on later from blocking of the drainage channel by inflammatory products or a tumour. If the onset is before the closure of the fontanelles, or spaces between the skull bones. the cranium may become very much enlarged by the pressure of the fluid. This, however, also makes room for itself inside the ventricles by compressing the brain substance, and, in later life, when the bony case is firm, an increase of fluid can only exist by compression of the brain. If there is much compression, the mental faculties are likely to be impaired.

Slight cases of hydrocephalus are best left alone, but in severe cases an operation should be considered. *See* Brain.

HYDROCHLORIC ACID. Strong hydrochloric acid, which is sometimes referred to as spirit of salt, is a corrosive substance and when swallowed causes serious symptoms, which, with the appropriate treatment, are discussed under the heading Acid.

Hydrochloric acid is a normal constituent of gastric juice, 0.2 to 0.4 per cent being present. Dilute hydrochloric acid, in doses of 5 to 20 minims, is often useful therefore in dyspepsia, particularly when this depends on a deficiency of the natural acid or on sluggishness of the liver.

HYDROCYANIC ACID. Also known as prussic acid, hydrocyanic acid exists in nature in certain plants, for example, in cherry-laurel leaves and in bitter almonds.

In small doses the dilute acid is used as a gastric and respiratory sedative and is also applied to the skin as a local sedative for itching. In other than small doses it is a deadly poison. Emergency treatment is described under the heading Almond.

HYDROGEN PEROXIDE. Differing from water by containing an extra atom of oxygen in the molecule, hydrogen peroxide gives off this extra oxygen when it comes into contact with organic tissues and other substances and thus acts as a disinfectant, deodorant and bleaching agent. It is generally used in the form of the official solution in water which should yield ten times its volume of oxygen. As a lotion for wounds and ulcers, a mixture of equal parts of the official solution and water is generally used, but the solution may be used undiluted. This may also be dropped into discharging ears and into an ear blocked by wax, as it may soften and break up hard plugs.

Diluted with three parts of water, the solution of hydrogen peroxide makes a good mouth wash, and is especially useful for cleansing the mouth during fevers. With an equal amount of water which has been boiled and is still warm. it makes a good application for chilblains, used as a lotion for about 15 minutes twice daily. Hair that is to be bleached with the solution should first be washed thoroughly with soap and water to get rid of grease. The solution is then rubbed in until the hair assumes the required tint, after which it is washed with plain water.

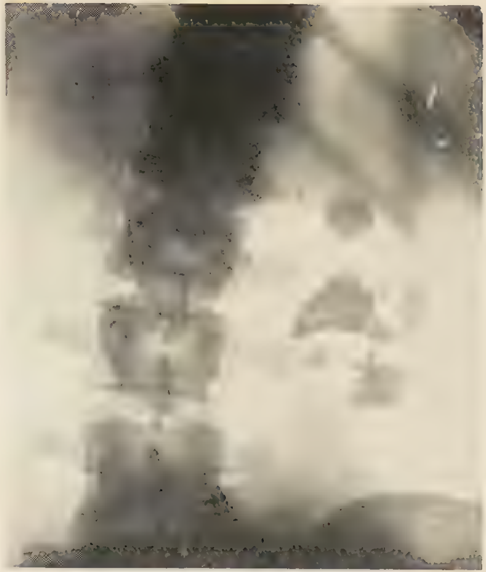
HYDRONEPHROSIS. A sudden, complete obstruction to the flow of the urine from a kidney, as when a stone completely blocks the ureter, stops the secretion of urine by the kidney altogether; but a gradual and incomplete obstruction causes hydronephrosis; that is, a dilatation of the pelvis and calices of the kidney. The dilated kidney forms a cystic swelling which may be of large size, and the ureter may also be widely dilated, so much so as to resemble a piece of intestine. Sometimes the contents of the swelling become purulent, constituting a pyonephrosis. Treatment is directed to removing the cause, if possible. Frequently, however, the affected kidney must be removed. *See* Bladder; Kidney.

HYDROPHOBIA. Known as rabies when it occurs in dogs or other lower animals, hydrophobia is caused by a micro-organism, not yet identified, which is contained in the saliva of a person or animal suffering from the disease and inoculated into a fresh subject by a bite. The infection passes up the nerves until it reaches the brain, when, sooner or later, symptoms make their appearance. The time elapsing between the bite and the manifestations of the disease is usually from one to three months. It varies with the distance of the site of the bite from the brain, so that the disease would be likely to appear much sooner, for example, after a bite on the face than after one on the leg.

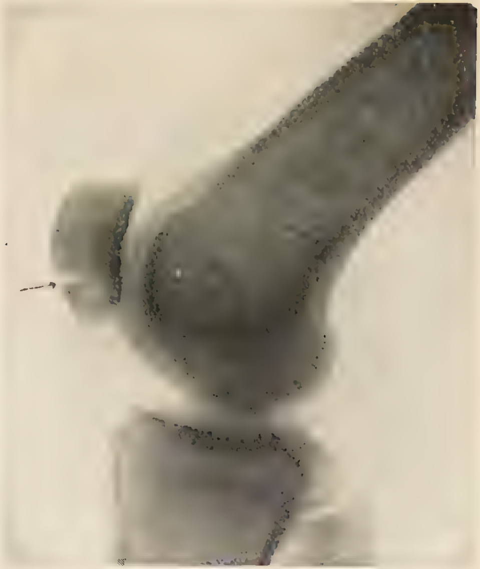
Thanks to the quarantine imposed on dogs entering Great Britain, rabies is practically unknown nowadays, and therefore there is no hydrophobia. Should, however, a dog that has bitten anyone behave queerly, it should not be destroyed at once, but be kept isolated and chained up. If it is suffering from rabies it will be dead within ten days; if it survives this period, a bitten person need have no fear of hydrophobia.

A dog suffering from rabies becomes morose, irritable and restless, and seeks to bite other dogs, large or small, even although it may have been timid previously. It tends to wander from home. It loses appetite, though it may exhibit a desire to gnaw at mats, woodwork or rubbish of any kind. It does not display any dread of water, as an infected human being does.

The first signs of the disease in a human being are apprehension, restlessness and slight difficulty in swallowing, with a slight rise in temperature. After a time any attempt at swallowing produces very powerful spasms of the muscles of the mouth and larynx, with great difficulty in breathing. The patient therefore develops that terror of water which is implied in the name of the disease. Saliva cannot be swallowed. There are attacks of extreme restlessness and sometimes the patient becomes maniacal. This goes on for from about thirty-six hours to three days, after



Kidney. Uric acid calculi in the left kidney



Knee. Fracture of the patella or knee-cap

CONDITIONS IN THE HUMAN BODY REVEALED BY THE X-RAY

Figure of 8 bandaging for the knee joint

Use of a mat to prevent housemaid's knee

KNEE : PROTECTING THIS SUSCEPTIBLE JOINT

Some of the little patients at the Stanmore branch of the Royal Orthopaedic Hospital, which is specially adapted for outdoor life, an [illegible]

Many parents of ailing children are unable to send them to a sunny and bracing climate. The Arnold Alpine sun lamp, therefore, has been designed to direct artificial sunlight upon diseased skins or crippled limbs. Goggles must always be worn to protect the eyes.

MODERN METHODS IN THE TREATMENT OF AILING CHILDREN

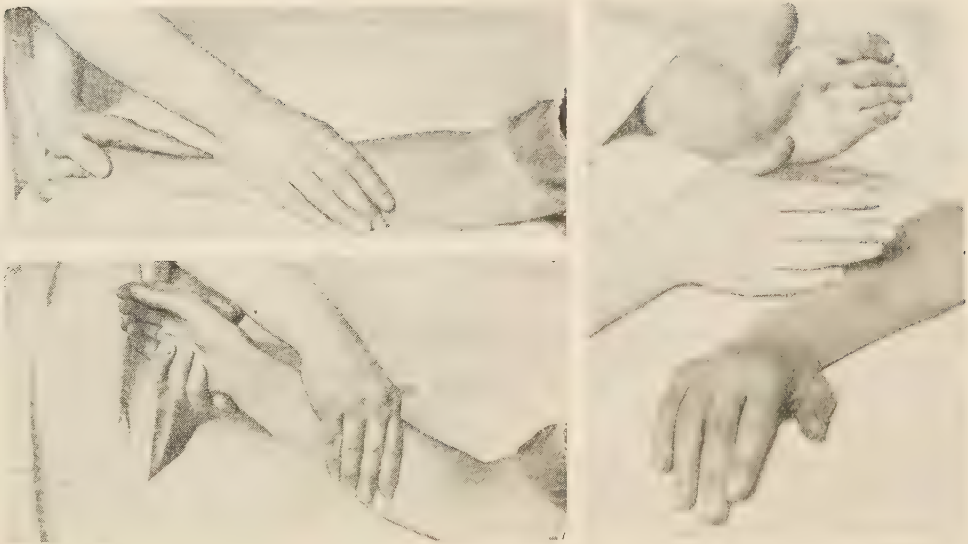


Fig. 1. Effleurage, a light stroking movement for promoting circulation. Fig. 2. Pétrissage, for building up muscular tissue. Fig. 3. Hacking, to stimulate the muscles

MASSAGE : THE PRINCIPAL MOVEMENTS ILLUSTRATED

which spasms disappear, unconsciousness supervenes, and the patient dies.

If there is any possibility that an animal that has bitten someone is rabid, the wound should be cauterised with a red hot wire, or be treated with undiluted carbolic acid or a similar disinfectant. This cauterisation should be done as soon as possible; if not done within twenty-four hours after the bite it is probably useless. Treatment should be carried out by a doctor. The matter should be reported at once to the medical officer of health or to the police. Antirabic treatment by vaccines is carried out in Great Britain at St. Thomas's Hospital, London, and should be obtained if the biting animal proves to be rabid.

HYDROTHORAX. The presence of dropsical fluid in the pleural cavity is described as hydrothorax. It may occur when the heart is failing, when a tumour in the chest obstructs the circulation through the veins, in Bright's disease and in other conditions. If the pressure of the fluid is injurious, it may be removed by tapping, but the underlying condition must be attended to in any case. *See* Dropsy; Pleurisy.

HYOSCYAMUS. *See* Henbane.

HYPERACIDITY. An excessive secretion of gastric juice is called hyperacidity. This is also meant now by the term hyperchlorhydria, the idea of an excessive amount of hydrochloric acid in the juice, implied by this term, having been abandoned, at any rate for all practical purposes. Hyperacidity may occur in a temporary derangement of digestion and is usual in chronic gastritis and when there is a gastric or a duodenal ulcer. Hyperacidity also causes heartburn and acid eructations.

A powder consisting of 10 grains of bismuth carbonate, 15 grains of sodium bi-carbonate and 20 grains of magnesium carbonate is useful in hyperacidity, but the actual causes should be determined. *See* Acidity; Digestion; Indigestion.

HYPERAEMIA. An increased amount of blood in an organ or tissue is called hyperaemia. This is said to be active when there is an increased supply of arterial blood, and passive when the blood accumulates from slowness in the venous flow. Active hyperaemia occurs in acute inflammation and is often induced artificially by mustard or some other counter-irritant in order to increase the nourishment of the part to which the blood is drawn, or to withdraw it from some congested part. Passive hyperaemia may be induced by an elastic bandage, applied sufficiently firmly to retard the venous flow without obstructing the arterial flow, or by cupping. *See* Bier's Method; Congestion.

HYPERAESTHESIA. When merely to touch a part causes a painful sensation, hyperasethesia is said to exist. This not uncommonly occurs on the scalp, for example, in women at the menopause, and in gouty persons. In hysteria hyperaesthetic areas may occur on different parts of the body. A general hyperaesthesia all over the body of a young child warrants a suspicion of the onset of rickets. *See* Sensation.

HYPERMETROPIA. Popularly regarded as long sight, hypermetropia is really weak sight, that is, a diminished power of focusing objects on the retina without calling in the aid of the ciliary, or focusing muscles. This leads to eye strain and requires convex lenses for its correction. *See* Eye.

HYPERPIESIS. For the proper circulation of the blood a sufficient degree of blood pressure (q.v.) is necessary. Clinically the blood pressure is estimated by an instrument called a sphygmomanometer, which is generally used on a brachial artery. An increased pressure, judged according to what is usual at the person's age, is described as hyperpiesis. This may be a temporary occurrence, as during excitement or muscular exertion. It may occur, for example, merely from excitement due to the fact that a doctor is applying a sphygmomanometer. Some people are found to have hyperpiesis, on the one hand, or an unusually low blood pressure, on the other, for years without apparent effects on health. Hyperpiesis, however, in conjunction with weakening of the arterial walls, involves a risk of rupture of the vessels, such weakening being caused, as a rule, by micro-organisms or their poisons.

Hyperpiesis leads in time to hypertrophy of the heart and of the muscle coat of the arteries. About middle age hyperpiesis may occur and be associated with indefinite illness, but the increased pressure may not be dependent on kidney disease or narrowing of the blood vessels by arterio-sclerosis (q.v.). The condition underlying this rise of blood pressure, or hyperpiesis, is called hyperpiesia. It can be remedied by taking a simple diet, moderate in amount, and sufficient open-air exercise. It is important, also, to get rid of worries, including worry over the increased blood pressure, should this fact be known to the patient. *See* Blood Pressure; Bright's Disease; Circulation of the Blood.

HYPERTROPHY. Growth of an organ or tissue beyond what would be proportionate to that of the body generally is called hypertrophy. The arm muscles of the blacksmith and the leg muscles of the racing cyclist are examples of hypertrophy due to the exceptionally vigorous exercise of a tissue. The heart muscle becomes hypertrophied when the outflow from its chambers is impeded by stenosis of a valve, narrowing of the peripheral arteries or other kinds of obstruction.

In some instances a compensatory hypertrophy occurs. Thus, if one kidney is lost, the other tends to increase in size to enable it to carry on the duty of the kidney that is lost.

Intermittent pressure causes hypertrophy, an ordinary corn being an instance of this. A corn consists of a hypertrophy of the horny layer of the skin due to intermittent pressure by a badly-fitting boot. Constant pressure on the other hand, causes atrophy (q.v.).

HYPNOTIC. A drug that induces sleep is described as a hypnotic or soporific. To this group belong the bromides, chloral, sulphonal, trional, veronal, paraldehyde and allied preparations. Narcotic drugs, such as alcohol and opium, also act as hypnotics, but cause a preliminary excitement ; they can also induce sleep in spite of the presence of pain. The treatment of chronic insomnia by drugs is fraught with grave danger of forming a drug habit. *See* Insomnia.

HYPNOTISM. The phenomena of hypnotism depend entirely upon suggestion. The operator suggests to the patient that he feels sleepy and he becomes so, that he is asleep and to all appearance he is, though he remains susceptible to the operator's voice and to further suggestions from him.

If the sleep is deep the patient remembers nothing of what takes place during it. Nevertheless, while in this condition he can remember things that have happened, including dreams, the memory of which has been repressed and apparently forgotten. Also, if he receives a suggestion to do something at some particular time after he has awakened from the hypnosis he will do it, although unable to give any reason for doing it.

The ability to expose the unconscious mind makes hypnotism a useful method of discovering repressed ideas or experiences which may be exerting an injurious effect on health, and of dealing with dissociation states, such as dual personality, as by treatment during hypnosis the forgotten or unknown experiences can be remembered by the patient in his waking state, and thus be related to his conscious personality.

The ability to influence conduct during the waking state makes hypnosis sometimes a useful method of dealing with drug-addiction, dipsomania or other injurious habits or impulses. Insomnia may be cured by hypnotic suggestion. Sometimes menstrual irregularities are susceptible of similar treatment.

Hypnosis should only be carried out under medical supervision and for purposes of diagnosis or treatment. If the operator is skilful and trustworthy, no harm can result. *See* Auto-suggestion ; Mind ; Psycho-therapy.

HYPOCHONDRIASIS. The healthy person pays little attention to the ordinary working of his organs. He chews and swallows and breathes without noticing, and so for other functions. A hypochondriacal person is excessively preoccupied with some one or more of his functions, and the conscious performance of a function which is usually done automatically, swallowing, for instance, readily gives rise to the idea that the function is not being done properly ; it is but a step to the further notion that there is some obstruction in, say, the gullet. The digestive apparatus is the most usual preoccupation of the hypochondriac.

Treatment is unsatisfactory. Patient persuasion of the groundlessness of the worry and an attempt to establish an interest in other things than his health may benefit a person suffering in a mild degree. Pyscho-therapy of some other kind may sometimes help. There is always the possibility that the condition may progress and become melancholia. *See* Auto-Suggestion ; Mental Disease ; Psycho-therapy.

HYPOGASTRIUM. The lowest part of the abdomen, towards the middle line, is called the hypogastrium. In this part are coils of small intestine and the beginning of the rectum.

HYPOGLOSSAL NERVE. The twelfth pair of cranial nerves, known as the hypoglossal, which have their origin in the bulb, or medulla, supplying the tongue muscles and some other muscles in the neck. *See* Brain; Tongue.

HYPOPHOSPITE. Salts of hypophosphorous acid or hypophosphites, are largely used for their tonic properties especially in nervous debility and wasting diseases. Sodium hypophosphite is official and is given in doses of 3 to 10 grains, but numerous other hypophosphites are in use.

The compound syrup of hypophosphites, dose ½ to 2 drachms, and the glycerol of hypophosphites, dose 1 drachm, contain a number of the hypophosphites, including those of iron, quinine and strychnine, and Fellow's syrup is said to have a similar composition.

HYSTERIA. A young woman who becomes hilariously excited but mixes her laughter with tears is readily identified by anyone as being hysterical, but the manifestations of hysteria are by no means limited to displays of this kind, but may simulate a large number of different disorders. The tumultuous emotional state just mentioned, which is often accompanied by a feeling of a ball rising in the throat—the globus hystericus—and threatening to choke the patient, may be followed by a convulsive seizure, a hysterical fit.

Sometimes this suggests an attack of epilepsy (q.v.) but is usually distinguishable by noting that the patient does not hurt herself in falling, though on some occasions she may do so, that she does not bite her tongue or void urine, and that the eyes are tightly closed, an attempt to open them being resisted, facts that point to the patient not being unconscious.

On rare occasions in hysteria a fixed attitude is taken up, an example being what is called the crucifixion attitude in which the neck, back and lower limbs are rigidly extended while the arms are stretched out on either side. A person suffering from hysteria may also pass into a trance or exhibit somnambulism or catalepsy. Amongst other manifestations of hysteria the following may be enumerated: muscular paralysis, anaesthesia, loss of voice, deafness, blindness, eructations, persistent absence of appetite, retention of urine, attacks resembling angina pectoris, cough, and so on. On investigation, however, it will be found that there is no organic change to account for such symptoms.

Similarly, as hysterical manifestations occur from no apparently adequate reason, a person who has been blind or deaf for years may suddenly recover the lost function, or a person who has been confined to bed for months because he was unable to walk or even stand, might leap from bed and run off, say, on an alarm of fire. Though things may be so, it must not for a moment be imagined that an hysterical patient is a malingerer; although there is no organic lesion there is a mental lesion, which is none the less definite. This lesion, which is described as dissociation, is seen most completely in the curious condition of dual personality, or double consciousness. It is similar to what occurs in hypnotism (q.v.), in which state, for example, a suggestion that a limb is paralysed, or a part of the skin insensitive, would be acted upon. A hysterical person is extremely open to suggestion, especially such as is favourable to his view of his malady, and this includes auto-suggestion (q.v.).

The genesis of dissociation is well illustrated by the soldier who, exposed to the perils and strain of the trenches, has an intense desire to get away from it all, but who represses the desire because of his sense of duty. He develops, however, hysterical paralysis of the legs, or it may be some other disability, incapacitating him for duty. The sort of person to whom this might happen is thought by many authorities to be already the victim of a mental conflict of which he was unconscious, a conflict dating from childhood, in which repressed desires, according to Freud of a sexual character, were pitted against an acquired standard of conduct.

It is the energy inherent in these childish repressions which directs the solution of the new conflict into such a conversion neurosis as paralysis, or into an anxiety state, marked by such symptoms as introspection, apprehension, tremor, palpitation, shortness of breath, sweating, headache, and so on.

Formerly, hysteria was treated by different kinds of suggestion, including the use of electrical apparatus and the unpleasant drugs asafoetida and valerian, and symptoms were doubtless often relieved, but in view of what is now known of the essential nature of the disorder it is clear that it cannot be satisfactorily treated without some kind of psycho-therapy. In hysteria there is a profound craving for sympathy and an injudicious, though natural, response to this by relatives will but aggravate the complaint. It may, therefore, be necessary to isolate the patient under the care of an intelligent nurse. *See* Auto-suggestion ; Epilepsy ; Pyscho-therapy.

ICHTHYOL. A tarry substance obtained by distilling mineral deposits containing fossil fish, ichthyol or ichthosulphol acts as an antiseptic and local sedative. It also causes contraction of the surface blood vessels when applied to the skin or a mucous membrane and, taken inwardly, it often relieves flushing during the menopause and in acne rosacea (q.v.). The dose is 10 to 30 grains a day. Pessaries or plugs containing it are used for female disorders, and suppositories for treating piles.

An ointment containing 30 per cent may arrest the spread of erysipelas, and preparations containing 5 per cent upwards may prove of benefit in eczema, psoriasis, pruritus, burns, etc.

ICHTHYOSIS. Fish-skin disease, or ichthyosis, is an abnormality of the skin which is characterised by dryness and scaliness. It is inherited and is one of those diseases which may be transmitted by a mother who does not herself show evidences of it. It makes its appearance in the early months of life. Sometimes the scales are very small, the chief symptom being the dryness of the skin, a condition referred to as xeroderma ; but the scales may be larger and the skin have a dirty-grey colour, and in severer forms there may be thick accumulations of scales giving a blackish colour to the skin.

The condition cannot be cured and persists throughout life. Much may be done, however, to mitigate the disorder by frequent warm baths and by keeping the skin greased. If there is thick scaliness, soda baths are an advantage.

ICTERUS. Jaundice is also called icterus. Jaundice in the new-born, icterus neonatorum, is usually due to breaking down of excessive red blood corpuscles, but may result from septic infection of the umbilical cord. *See* Jaundice.

IDIOCY. The most deficient degree of mental development, idiocy, may be due to injury to the brain or its membranes in very early childhood. Sometimes it follows a succession of fits. It occurs with a very small head, say, one that is less than 17 inches in circumference and in some children who suffer from hydrocephalus (q.v.). Inherited syphilis has appeared to be responsible for other cases.

Idiocy is likely to occur when a child is born blind or deaf, or loses these senses shortly after birth. A curious complaint, amaurotic familial idiocy, in which blindness and progressive mental and bodily weakness occur, is usually found in Jews, and, as its name implies, several members of a family may suffer.

In the idiocy of cretinism (q.v.) a very striking improvement follows the administration of thyroid extract. In other types very little can be done. *See* Feeble-minded ; Mental Disease.

IMMUNITY. The usual meaning attached to the word immunity when it is used as a medical term is insusceptibility to some infection. But, though an individual appears to be naturally immune to an infection, it may be possible to destroy this immunity in some way. The liability of a human being to contract a common cold after an overdose of alcohol or a chill is notorious, and so for other infections. Over-fatigue, starvation and other factors which lower the vitality may destroy immunity.

Infection is due to some micro-organism securing a footing in the body, and immunity must depend on some condition, or conditions, in the body inimical to the invasion. If such exist from birth there is a natural immunity, but when this is absent immunity may be acquired in various ways. A person who has had smallpox, for example, is unlikely to take it again ; he has acquired immunity to this disease. Partial immunity may be acquired to other diseases, though the duration of the immunity, instead of being life-long, may last for a very short time, as in influenza, for example. Vaccination against smallpox may also confer immunity : here the vaccinated person passes through an attack of cow-pox, a modification of the other disease. Again, immunity may be acquired by inoculations with killed disease-germs or their poisons, or with an antitoxin.

The normal resources of the body against bacterial invasion include the activity of the white cells of the blood and a bactericidal action of the serum, which appears to be derived from the white cells. The latter attack bacteria and devour them, on account of which they are called phagocytes, or cell-eaters. Bacterial poisons, however, whether contained within the organism itself or set free by it, excite the body cells to produce various substances, collectively known as antibodies, which either neutralise the poisons or destroy the bacteria. One of these causes clumping or agglutination of germs ; another, called an opsonin, renders the germs more vulnerable to phagocytes ; and a third, called the immune-body, in conjunction with complement, a substance normally contained in the blood, breaks up the germs.

It is the formation of such substances that enables a person to recover from the attack of some infection, and it is the persistence of some quantity of such substances that confers immunity against further attacks of the same kind of germ ; not of any other kind, as the antibodies are only effective against the particular germ, or antigen, as it is called, that has led to their production. Vaccines of dead bacteria or their poisons act as antigens, and provoke the formation of antibodies. They therefore create what is called an active immunity to an infection, as opposed to the passive immunity conferred by injections of an antitoxin, which only neutralises the bacterial poison.

With regard to some diseases a relative immunity may exist in various races or peoples. Thus, coloured people, although they suffer from malaria, do not sustain any damage commensurate with that inflicted by the same disease on white people. Similarly, measles and other diseases which have been endemic in a population for many generations have not the virulence that they manifest when they occur in a population which has previously been free from them. *See* Antibody ; Antitoxin ; Serum Therapy ; Vaccine.

IMPERIAL DRINK. *See* Beverages.

IMPETIGO. A skin disease caused by infection with a streptococcus, impetigo chiefly affects children, and is usually found on exposed parts of the skin, and especially the face. Blisters form, and at first contain clear fluid, but this quickly becomes cloudy. After a short time the blisters burst, and their contents harden into yellow crusts which rather resemble beeswax. Each crust is surrounded by a narrow line of redness, and from beneath the crust clear fluid may escape, as this continues to ooze from the skin covered by the crust. There may be slight heat and itching, but otherwise there is no local disturbance, nor is the general health affected.

Infection spreads from any impetiginous lesion to sound skin, and the patient may bring this about by fingering a lesion and then touching other parts. By contact with the patient, or with a towel or anything which has been in contact with him, healthy persons may acquire the disease.

As washing with ordinary soap and water spreads the infection, it should be discontinued for a few days, and the lesions dusted with some such powder as the following:

Boric acid	60 grains
Zinc oxide	60 grains
Powdered talc	to 480 grains

Or a little of the following lotion may be dabbed on each spot:

Powdered calamine	60 grains
Zinc oxide	60 grains
Precipitated sulphur	5 grains
Glycerin	½ drachm
Water	to make 1 ounce

When the spots are dry, the separation of the crusts may be hastened by the application of an ointment consisting of one part of white precipitate ointment to three parts of zinc ointment. If there is difficulty in removing crusts, a starch poultice, described under the heading Eczema, should be applied.

IMPOTENCE. A man may be quite able for sexual intercourse but be impotent to procreate children. The reasons for this state of affairs are discussed under the heading Sterility. On the other hand, a man may be impotent in that he cannot undertake or complete sexual connexion.

Debilitating diseases, like diabetes melitus and chronic Bright's disease, are likely to cause impotence and possibly it will occur with obesity. Some diseases of the spinal cord, notably locomotor ataxia, are other causes. The excessive use of alcohol and, it is said, tobacco, may have this effect, and addiction to morphine or other powerful narcotics for any length of time certainly has. Excessive sexual indulgence is followed by more or less incapacity for intercourse. In many instances a functional nervous disorder, such as neurasthenia, is responsible; here the impediment is psychical. A temporary impotence, also of psychical origin, is quite common just after marriage, but need cause no apprehension as it soon disappears.

Treatment must be guided by the circumstances in each case. Quack advertisements should be ignored, as the nostrums they recommend are likely to be useless and may be dangerous. If progress is not satisfactory a doctor should be consulted; he will advise as to aphrodisiac drugs and as to the propriety of using them. *See* Genital System.

INDIAN HEMP. *See* Cannabis Indica.

INDIGESTION. When discomfort of some kind accompanies or follows a meal it is natural that it should be ascribed to indigestion, or dyspepsia. It may be a sense of weight or fullness in the pit of the stomach or actual pain, either of a dull, steady character or more acute and perhaps spasmodic. This may set in almost immediately or at a variable time after the meal has been taken. There may be a feeling of nausea or perhaps actual vomiting which may, or may not, relieve the pain or discomfort.

Sometimes there is a sharp, burning feeling at the lower end of the breast bone, described as heartburn or pyrosis, and this may be accompanied by the regurgitation of an acid, acrid liquid into the mouth, or water-brash. Sometimes flatulence (q.v.) is a troublesome symptom. The tongue may be furred and there may be a nasty taste in the mouth, and, perhaps, an unusually free flow of saliva. There may be headache and possibly giddiness also.

It is not enough, however, merely to recognize the existence of indigestion because, in the first place, this may depend on different stomach disorders, demanding widely different kinds of treatment; in the second place it may depend on disorders of digestive organs other than the stomach, or even on disorders not directly related to digestion at all; and, in the third place, symptoms such as vomiting and pain in the pit of the stomach, which suggest indigestion, may have nothing to do with this process.

In the first of these groups it will be necessary to distinguish symptoms due to mere functional derangement from those caused by gastritis, dilation of the stomach, gastric or duodenal ulceration, cancer of the stomach, dropping of the stomach or gastroptosis, and other disorders noted under the heading Stomach or under special headings of their own. It may be pointed out, however, that when indigestion occurs in a middle-aged person who has not had previous trouble of the kind, and which resists ordinary treatment, it suggests cancer of the stomach.

In the second group, in which indigestion is due to disorders outside the stomach, mention may be made of cirrhosis of the liver, cholecystitis, or inflammation of the gall bladder (q.v.), chronic appendicitis, chronic peritonitis, chronic nephritis, disease of the heart or lungs which causes congestion of the stomach lining, consumption, anaemia and so on. Or some mental condition, such as neurasthenia, hysteria or hypochondriasis, may underlie the symptoms of indigestion.

To the third group, that is, instances in which symptoms may be erroneously ascribed to indigestion, belong such events as vomiting due to brain tumours or other kinds of irritation of the brain, and the so-called gastric crisis of locomotor ataxia (q.v.).

In view of such a wide range of possible causes of symptoms of indigestion it is not possible to lay down any simple kind of treatment. It may be said, however, that if a person has too few teeth or has bad teeth, if he chews food insufficiently, if he is in the habit of taking too much food or food that is too rich, if he takes too much condiment, or alcohol, or uses too much tobacco, if he suffers from chronic constipation or takes too little open-air exercise, it is highly possible that by correcting such defects he may cure his indigestion. *See* Acidity; Appetite; Bismuth; Charcoal; Constipation; Diet; Digestion; Fasting; Gastritis; Hyperacidity; Liver; Stomach.

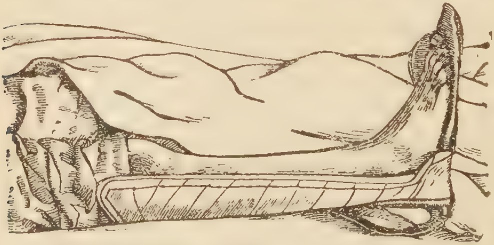
INFANTILE PARALYSIS. The disease known as infantile paralysis is an acute inflammation of the grey matter forming the anterior horn of the spinal cord, what is scientifically described as an acute anterior poliomyelitis. It affects young children mostly, but occasionally occurs even in middle-aged people. It is caused by a filter-passing virus which invades the nose and throat, whence it makes its way along the spinal cord or, sometimes, to the brain. The disease is most prevalent in the hot months, and may occur as an epidemic. The organism may exist in the secretion of the nose or throat of persons who show no signs of the disease, but who act as carriers.

The onset is acute, with fever, perhaps, headache and vomiting, and possibly convulsions. There may be pain and tenderness in one or more limbs, and in from one to three days it will be noted that the child has apparently lost the use of one or more limbs and in a short time the affected limbs will begin to waste. Sometimes the initial symptoms are so slight as to be overlooked or attributed merely to a slight chill, and the first thing to cause alarm is the paralysis and wasting of a limb.

The acute stage of the disease lasts from four to six weeks, as a rule, and then more or less recovery occurs, but some muscles are left paralysed, though possibly only a group, probably the extensor muscles of one of the lower limbs, that is to say, the muscles that raise the foot. The affected limb is colder than the other, and is possibly blue ; and, as the growth of the bone is interfered with, the limb is shortened.

Immediately the existence of the disease is noted the patient should be isolated. A notification must also be sent to the Medical Officer of Health. During the acute stage absolute rest in bed is necessary. Aspirin or salicylate of sodium is used to relieve pain, if necessary, and hexamine may be given in the hope that it will have an antiseptic effect against the organisms.

To prevent affected muscles from being stretched by the action of opposing healthy muscles, some kind of splint may be advised. Thus, to prevent foot drop, what is called a bed-shoe may be worn. This is a splint with a foot-piece which keeps the foot at right angles with the leg.


INFANTILE PARALYSIS. Use of special splint

After about two weeks, as a rule, massage may be commenced, and when the acute stage is over, the patient should be encouraged to move the limb regularly, and electricity may also be used to exercise the muscles. A long, thick stocking should be worn on a lower limb to maintain warmth. When the patient is able to be about, dropping of the foot should be prevented by a spring attached to the leg and the boot. *See* Encephalitis; Paralysis; Virus.

INFANTILISM. A person who fails to develop adult characteristics is said to be the subject of infantilism. This may be the result of congenital syphilis, or of chronic poisoning with alcohol, morphine, lead or other poisons. In other cases it is due to defects in important organs. Thus, there are types caused by thyroid deficiency. One of these is cretinism (q.v.), and the administration of thyroid extract makes a marvellous improvement. *See* Growth; Myxoedema; Thyroid Gland.

INFARCTION. There are two kinds of infarction, the red or haemorrhagic, and the white, but each is caused in the same way, by the sudden arrest of the blood flow in an end artery. The stoppage is usually due to an embolus, or plug. The result is that a wedge-shaped piece of tissue is deprived of blood and may die; as it contains no blood it is pale and so is called a white infarct, or infarction. This is the common kind in the spleen and kidney, for example. It may happen, however as in embolism of the lung, that blood from neighbouring veins passes back into the emptied vessels before these have become devitalised, and it does so to the extent of engorging them. This is called a red infarct. All necrotic tissue is replaced by granulation tissue and ultimately by a scar. *See* Embolism.

INFECTIOUS DISEASE. A disease which is transmissible from one person to another is said to be infectious. If actual contact with the diseased person is necessary to convey it to another, the disease may be called contagious. Some infectious diseases, such as tuberculosis, anthrax, glanders, ringworm, and aphthous fever may be derived from the lower animals. A disease is infectious because it is due to a living organism which can multiply in or about one person, and be discharged and become parasitic in or on another person.

Some parasites, like those of a common cold or influenza, are discharged in the breath, especially when coughing or sneezing, and in such diseases as tuberculosis and pneumonia the sputum teems with organisms which may be dispersed by coughing, or as a fine dust when the sputum dries. The infection of diphtheria may also be coughed out. The purulent discharge from the nose or ears which may accompany scarlet fever and other diseases is another source of infection. The dried crusts of smallpox and chicken-pox are infective, and their dust contaminates the air.

The parasites of other diseases, such as typhoid fever, dysentery and cholera, are chiefly spread by contaminated water, and these are therefore often described as water-borne diseases. Not only may infection come from drinking such water, but from utensils or fresh vegetables or fruit which have been washed with polluted water. Milk may be charged with parasites by being kept in such vessels, or by dilution with the water. Ice-cream may also convey infection. The parasites of these diseases are discharged from the body in the stools and possibly the urine also. Infection often occurs from flies visiting the stools and then coming into contact with food.

Other insects convey infection when they bite; or infected faeces of an insect may be inoculated into the skin by scratching. By the last method typhus, relapsing fever and trench fever are disseminated by the louse. Mosquitoes, by biting, spread malaria, yellow fever, dengue and filariasis; the flea transmits bubonic plague; the bed bug, plague and possibly leprosy and other diseases; the tsetse fly, sleeping sickness; the sand-fly, three-day fever; and the tick, relapsing fever.

Articles of clothing, books and other objects which have been in contact with an infected person may carry the infection, and are referred to as fomites.

Not only may a person actually suffering from a disease be a source of danger to others, but also some who have recovered but still retain a focus of infection in the body. Such a person is called a carrier (q.v.), and typhoid fever, dysentery, diphtheria, cerebro-spinal fever and other infections may be spread by such.

The infectious diseases which have a characteristic rash, or exanthema, manifest a series of fairly definite stages. There is first a period of incubation, during which the organisms which have entered the body are multiplying and establishing themselves. This period varies for each disease, sometimes within fairly wide bounds. Then follows the prodromal period, in which occur the symptoms of the disease preceding the rash. In measles, for example, these resemble those of a common cold, while in scarlet fever there are headache, sore throat and vomiting. Next is the period of rash, and, following this, the period of decline of the symptoms, which merges into the final stage of convalescence. Infectious diseases which have no characteristic rash exhibit, apart from this fact, a similar sequence of stages.

A person suffering from an infectious disease should be isolated until all danger of communicating the infection has passed. With respect to a common cold or slight influenza, this will be considered a counsel of perfection, but even in these diseases the patient should try as far as possible to protect others. It may be possible to isolate a patient at home, but if there is any difficulty in doing so, and especially when the disease is a serious infection, the patient should be sent to an isolation hospital.

At home the room chosen should be at the top of the house, and should have a fireplace. Preferably it should open on a corridor ventilated by a window, and if the corridor has a sink in it, so much the better. A sheet wrung out of lysol solution, a teaspoonful to the pint of water, or some other antiseptic, and hung over the door, has the advantage of emphasising the fact of the isolation if it does nothing more. Carpets, heavy hangings, and all unnecessary furniture should be removed before the patient goes into the room. Feeding and other utensils used by the patient must be kept for his separate use, and water used for washing the patient or his clothing or utensils, also the stools and urine, should be adequately treated with a disinfectant before being poured into a sink or privy, as the case may be.

The person told off to attend to the patient should wear an overall when outside the room, and should mix with other members of the family as little as possible. Books should not be allowed to leave the sick-room. When the period of infectivity is over, the patient must be properly washed all over and dressed in fresh clothing, and the room and all its contents must be dealt with as described under the heading Disinfection.

Not only must the patient be isolated, but also anyone who has been in contact with him, or her, the duration of this quarantine being regulated by the incubation period of the disease, and estimated from the last date of exposure to infection.

Some infectious diseases must be notified to the Medical Officer of Health for the district, and this should be done immediately the diagnosis is made. Responsibility for notifying falls both on the doctor in attendance and on the head of the house or any other person in a similar position, but in practice the notification of a doctor usually suffices.

The diseases which must thus be notified are as follows: smallpox, scarlet fever, cholera, diphtheria, membranous croup, erysipelas, typhus fever, enteric fever (including typhoid and para-typhoid), relapsing fever, continued fever, puerperal fever, acute primary pneumonia, acute influenzal pneumonia, tuberculosis, ophthalmia neonatorum, cerebro-spinal fever, acute poliomyelitis, acute polio-encephalitis, encephalitis lethargica, plague, dysentery, and, if contracted in England or Wales, malaria. From time to time other diseases, such as measles and chickenpox, may be made notifiable in a particular district, or throughout the country. The duration of the incubation, isolation and quarantine periods for each infectious disease is given under the heading of the disease. *See* Bacteria; Disinfection; Fever; Flies; Formalin; Notification; Quarantine; Rash.

INFLAMMATION. There are four familiar signs of acute inflammation, namely, redness, heat, swelling and pain. The former two are due to a large influx of blood into the part, which is also in part the cause of the latter two signs, but these are more due to the discharge of a watery fluid or lymph from the vessels which distends the tissues, thus compressing the ends of the sensory nerves and causing pain. The smaller arteries, the capillaries and the veins are all filled with blood, and the circulation through them is more rapid at first, but it slows down, and sometimes to such an extent that the blood, having oscillated several times backwards and forwards, ceases altogether to flow. With the slowing of the rate of flow the white blood corpuscles accumulate along the wall of the blood vessels, and many of them make their way out between the cells forming the vessel walls.

The flow of lymph and the migration of the white cells have a salutary purpose, as the former contains substances which are lethal to invading micro-organisms, while the white cells not only devour germs, but also products of inflammation. From their exercising this function they are called phagocytes. The irritation underlying the inflammation may cease to operate and normal conditions be restored, the processes taking place in the reverse order to what has just been described. Sometimes, however, the fight against invading germs is not so successful, and many white cells are killed, forming an abscess (q.v.); or a piece of tissue may be killed, as occurs in a boil.

Inflammation is most commonly due to micro-organisms, but may also be caused by irritants of other kinds. Heat might be responsible, as in a burn; or sunlight, as in solar dermatitis.

In treating inflammation it is important to secure rest for the affected part as far as possible. It may be possible to get rid of the origin at once, as when a foreign body is causing inflammation of the eye. When germs are concerned, the most that can be done in this way is to assist the tissues in their fight. Cleaning up a dirty wound, the injection of an appropriate serum or vaccine, incisions into the tissues to allow the escape of pus and toxic fluids, and cleansing the bowels and thereby the blood by administering a purge, are methods of assisting Nature.

Another method is to apply hot applications which encourage a free supply of blood to the part, so increasing the supply of lymph and of phagocytes. They also ease the pain.

INFLUENZA. In view of the relative frequency of its epidemics and their wide range, the debilitating effects of the disease, the number of the possible complications, and the fatality attending some of these, few diseases can be considered to be more redoubtable than influenza. It has been found that epidemics tend to recur every 33 weeks, though if the time when an epidemic is expected happens to fall in the summer, the epidemic will probably not occur. From time to time an epidemic ranges all over the world, the last pandemic being in 1918.

Influenza is due to a germ, and there is good evidence for believing that the influenza bacillus of Pfeiffer is the one primarily responsible, though it must be admitted that this question has not been conclusively settled, as other germs, such as pneumococci, streptococci, and a filter-passing virus, have been found in association with the disease, and may be responsible for at least some of the complications.

The onset of influenza is sudden, and occurs from one to four days after exposure to infection. Running at the eyes and nose may suggest a bad cold, but usually the fever is higher, there is considerable headache and pain in the back and limbs, and more prostration. Often the throat is sore, and there is a dry, irritating cough. The tongue is furred, and there may be nausea and perhaps vomiting; sometimes there is pain in the abdomen, and there may be diarrhoea. The brunt of the disease may indeed fall on the digestive organs, and the symptoms be so sudden and severe as to suggest food poisoning. Sometimes also there is no sign of irritation of the eyes or the air passages, but the headache and pains are severe, and there may be delirium. In some instances the onset is unusual as, without feeling noticeably unwell, a person has dropped unconscious in the street. Influenza thus shows considerable variation in type, and in different epidemics one or other of these types may predominate.

Ordinarily, after having persisted from three to five days, the temperature drops, suddenly as a rule. Some complication, however, may interfere with such a favourable issue, and even as the type of disease may vary in different epidemics, so may the kind of complication. Bronchitis may become severe, and from the smallest tubes may spread into the lungs, constituting broncho-pneumonia, with a high temperature, rapid breathing and pulse rates, and lividity of the skin. Sometimes the lobar type of pneumonia develops, or pleurisy. This may go on to empyema, the accumulation of pus in the pleural cavity. Other complications include involvement of the heart and infection of the central nervous system. Even an apparently simple attack of influenza may have troublesome sequelae. There may be considerable mental depression, sometimes even melancholia, or serious incapacity for mental and physical exertion.

The general treatment of influenza is that of the state of fever, but special emphasis must be laid on the necessity for rest in bed, abundance of fresh air, and of sufficient time for convalescence. Aspirin in 10-grain doses is useful for relieving muscular pains and headache. This or salicin, sodium salicylate or quinine may be given at intervals in order to combat the toxaemia of the disease. The treatment of the complications which have been mentioned is discussed under appropriate headings to which the reader is referred. The patient ceases to be infectious in three or four days after the temperature has become normal. During convalescence a tonic such as Easton's syrup (q.v.) may be helpful. A change to the seaside or country should be made if possible when the attack has been more than a slight one.

The infection of influenza is mainly spread by the breath of an infected person, and the danger is increased by his sneezing and coughing. During an epidemic an infected person should be given as wide a berth as possible. It is a prudent thing to walk to business, for example, or go on the top of a 'bus rather than in a closed vehicle, and all rooms should be well ventilated.

It may help to lessen the risk to gargle the throat and spray the nose with a weak solution of permanganate of potash twice daily. Should suspicious symptoms make their appearance, 15 drops of essence of cinnamon or of spirit of camphor taken on a lump of sugar may cut them short. Mixed vaccines, containing the influenza bacillus and other germs associated with the disease, are of definite value. *See* Cold ; Cough ; Fever.

INHALATION. Chloroform, ether and other volatile drugs are administered by inhalation as general anaesthetics. The method is used for many other drugs, mostly in the treatment of respiratory disorders. Thus, the more urgent symptoms of asthma (q.v.) may be relieved by inhaling the smoke from fumigatory powders. In whooping-cough the air of the sick-room may be impregnated with the vapour of carbolic acid, lysol, or some similar substance by pouring a teaspoonful of the drug on a large iron spoon or a shovel which has been heated; or the drug may be placed in a shallow metal saucer or, as in some forms of apparatus, into a porous block, which is heated by a night-light.

Steam may be used to volatilise drugs, as in a Maw's inhaler, which is a porcelain jar with a tube through the cork to admit air, and a mouthpiece at the side by which the patient inspires the drug-impregnated steam. Friar's balsam, eucalyptus oil, turpentine and other remedies may be used in this way. A useful adaptation of this method is simply to put the hot water and drugs into an ordinary jug and cover the head and jug with a towel while inhaling.

Special inhalers are used for inhaling nascent ammonium chloride. Amyl nitrite is used by inhalation and is contained in a glass capsule which is broken in a handkerchief unless provided with an absorbent cover. Other drugs are used similarly. *See* Atomiser; Bronchitis Kettle; Gargle; Menthol; Spray.

INJECTION. Some remedies cannot be given by the mouth because they are altered by the digestive juices and become ineffective. They must be injected into the tissues to be of any use. This applies to insulin, for example, and to antitoxic sera and various other substances. Owing to the uncertainty regarding the rate of absorption from the alimentary tract an injection permits of more precise dosage, an advantage when one is dealing with a powerful drug; also a more rapid effect is secured by injection. Injection is the only method available for most drugs when the patient is unconscious.

The hypodermic method is the one most used for the general administration of drugs. Some drugs, however, such as quinine and mercury, are liable to cause an abscess when placed beneath the skin and are injected into muscles, an intramuscular injection.

In cases where these two methods cause too much pain, the intravenous route is selected. The solution is injected directly into a vein, generally one at the front of the elbow. The action of a drug is also obtained more rapidly by this route.

An injection into the spinal canal may be given in order to secure anaesthesia below the site of the injection or to secure the action of drugs within the canal. For sudden heart failure, say from electric shock or a drug, a solution of adrenalin or of atropine may be injected straight into the heart.

INNOMINATE. The haunch or innominate bone really consists of three bones, namely, the ilium above, the ischium behind, and the pubis in front. In early life these three bones are separated from each other by cartilage, but by the sixteenth year, as a rule, they are all fused into one bone. Each takes part in forming the acetabulum, a deep cup-like depression for the head of the femur or thigh bone. The reader is referred to the illustration to the article under the heading Hip. The term innominate is also applied to an artery and to two veins. *See* Hip ; Pelvis ; Thigh.

INOCULATION. The introduction of disease germs through the skin or mucous membrane is described as inoculation. This may be accidental, as by scratching or pricking with infected nails or instruments ; or it may be deliberate, as in inoculation against smallpox, when the living germs of vaccina, or cowpox, are introduced into the skin. The term inoculation has now been extended to cover also the introduction of dead germs or their poisons into the body with a view to increasing resistance to the living ones and so preventing disease. *See* Vaccination.

INSANITY. Persons who, by reason of mental defect or disorder, are unable to reach what is considered to be a reasonable standard of behaviour, or transgress what are considered to be reasonable limits of conduct, are classed as insane. Mental capacity may be below the average, or there may be mental disorder of some kind, but neither is supposed to constitute insanity unless the conduct of the person affords grounds for such an opinion. Thus, insanity is not synonymous with mental disease (q.v.) ; the term simply connotes some instances of mental disease.

When a person is insane the question of protection must be considered, protection of the individual himself and of others, and of the amount and kind of protection required. As regards congenital mental defects, reference to these subjects is made under the heading Feeble-mindedness. As regards those who become insane, apart from special considerations affecting pauper lunatics, wandering and neglected lunatics and criminal lunatics, there are the alternatives of keeping the patient at home or of his entering an institution for mental diseases, which again may be either a private asylum, or licensed house, a licensed hospital, or a public asylum which takes private patients. Again, an insane person may be capable of making a choice and may elect to go into an institution as a voluntary patient, or it may be considered necessary to certify him as insane and send him in.

A patient is usually admitted to an institution on a reception order made by a magistrate or other competent judicial authority on a petition signed, if possible, by the nearest relative and supported by two medical certificates. When immediate restraint is deemed necessary, as when the patient is very violent or has manifested strong suicidal tendency, he may be admitted on what is called an urgency order. This must be supported by one medical certificate. *See* Dementia ; Mental Disease.

INSOMNIA. Sleeplessness, or insomnia, may be incidental to febrile and other disorders, and the main line of treatment will be that required for the disease in question. In fever it may suffice to sponge the patient with tepid water. A wet pack will often succeed in producing sleep and this may be a hot pack, particularly if the fever is not high. A pack is especially useful if there is active delirium. In heart disease and other disorders when the patient has difficulty in lying down, sleep may be procured by putting a stool on the bed, and over this one or more pillows on which the patient can recline forward.

An occasional fit of insomnia may depend on one or more of a considerable number of disturbing influences, such as a close or overheated bed-room, too many or too few bedclothes, cold feet, an overloaded stomach or, on the other hand, the need for a little food, taking tea or coffee too near bed-time, excitement or worry. The removal of any such influence will probably be effective ; in any case a single bad night is unimportant.

It is otherwise, however, when insomnia is habitual, as this may lead to serious mental exhaustion, and apprehension of the loss of reason may reduce the patient to a state of desperation. An ever-present worry or anxiety may be responsible for this state of things and prevent a person from going off to sleep. Sometimes, on the other hand, a person goes to sleep but is awakened by terrifying dreams and to prevent the recurrence of these he remains awake.

In such circumstances it may be of some use to face the cause of worry or anxiety, the magnitude of which may be diminished by looking at it from all points of view. A free discussion of the subject with a friend would be helpful to this end. When the state of health is such that a calm and correct view of business, family or social difficulties is impossible, it will be well to make a change to some place where fresh interests will occupy the mind. When the mental trouble is not apparent help may be got by a resort to psycho-therapy.

A hot bath before retiring for the night often secures sleep, and a course of massage or electricity in an appropriate form are other useful measures. In many instances it will be necessary to take some drug, but this should only be done under medical supervision. Bromide of potassium, in doses of 30 grains dissolved in half a glass of soda-water, may be used to lessen excitement or the sense of mental strain and thereby allow sleep. *See* Diet ; Neurasthenia ; Psycho-therapy ; Sleep.

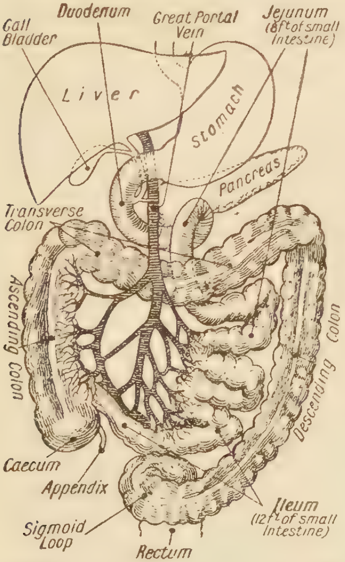
INSUFFLATION. The introduction of powdered drugs into body-cavities by blowing is called insufflation, and the apparatus for the purpose, an insufflator. A common type consists of a vulcanite tube attached to a rubber ball. Boracic acid powder is often thus blown into the ear when it is discharging.

INSULIN. From the pancreas of the lower animals a substance is obtained which represents the internal secretion of the islets, or insulae, of Langerhans, and it is accordingly known as insulin. It regulates the burning up of sugar in the body, and is deficient in most persons who suffer from diabetes mellitus (q.v.). Solutions of insulin are therefore used in treating this disease.

INTERTRIGO. Friction between skin surfaces that rub on one another may give rise to redness which is described as intertrigo, or erythema intertrigo. The commonest sites are on the inner surfaces of the thighs, in the groin, in the armpit, or, in fat women, beneath the breasts. In infants, intertrigo may be caused by the rubbing of a napkin. The separation of opposing surfaces by a piece of lint, after dusting them thoroughly with a bland powder, such as one containing zinc oxide and talc, usually suffices for a cure.

INTESTINE. The bowel, or intestine, is a long muscular tube, lined with mucous membrane, extending from the pyloric end of the stomach to the anus. The first part, or small intestine, has an average length of 20 ft., the first 11 in. constituting the duodenum (q.v.), and beyond this the jejunum, comprising two-fifths, and ileum, three-fifths, of the length.

The lower end of the ileum joins the large intestine about 2½ in. above the commencement of the latter, the passage between the two portions of gut being guarded by the ileo-caecal valve. The large intestine has an average length of 5 to 5½ ft., and comprises the caecum, ascending colon, transverse colon, descending colon, iliac colon, pelvic colon, rectum and anal canal.



INTESTINE. The parts that compose it

The duodenum is about 2 in. in diameter, but the small gut gradually diminishes in width, until, at the end of the ileum, this is little more than 1 in. The caecum is about 3 in. across, but the large bowel also diminishes in width, and in the descending and iliac colon, this is only about 1½ in. across.

The jejunum and ileum are completely surrounded by a smooth membrane known as the peritoneum, the two layers of which, reflected off the bowel, pass back to the posterior wall of the abdomen, constituting the mesentery, which anchors this long length of the intestine to the body wall. There is a partial peritoneal covering on the duodenum and the large intestine, but the caecum, the transverse colon, and the pelvic colon have mesenteries. Portions of the gut possessing a mesentery are very freely movable.

The muscular wall of the intestine consists of an outer layer of fibres running longitudinally, and an inner layer of circular fibres. The large intestine is constricted at intervals to form series of dilatations or sacculations. This arrangement, which is preserved by the three longitudinal bands which run along the gut, distinguishes the large from the small intestine. Within the muscular coat of the bowel there is a layer of loose connective tissue, the submucous coat, and, within this, the mucous coat. From near the beginning of the duodenum to midway along the ileum, the mucous membrane of the small intestine is disposed in folds at intervals; these folds, or valvulae conniventes, which do not run entirely round the inner surface of the bowel and have a crescentic shape, are meant to increase the extent of secreting and absorbing surface. The surface of the small gut also has a velvety appearance from the presence of an immense number of tiny, finger-like projections, or villi (singular, villus). In each villus is the beginning of a little lacteal vessel which conveys fatty foods to large vessels and on from these to the receptaculum chyli and the thoracic duct.

In the lining of both the large and small intestines there are numerous simple tubular glands, the so-called crypts of Lieberkühn. These are much bigger in the large intestine, and secrete a considerable amount of mucus. In the small intestine, but particularly in the lower part of the ileum, there are also circular or oval areas composed of nodules of lymphoid tissue, and known as Peyer's patches. These become much swollen and ulcerated in typhoid fever.

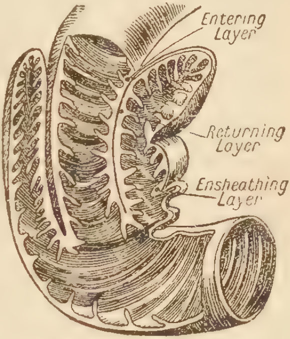
Intestinal juice, or succus entericus, which is secreted by the lining of the gut, contains a ferment, enterokinase, which is necessary to the activity of the trypsin in the pancreatic juice, and another ferment, erepsin, which aids in the full digestion of carbohydrates. The large intestine hardly contributes to digestion, and very little towards absorption of food. It is an important excretory organ, however, for lime, magnesium, iron and phosphates.

Food is passed along the intestine by wavelike contractions described as peristalsis. What is called segmentation also occurs, that is, contractions take place at short intervals, so that the contents are broken up into a series of portions. Then contractions take place through the middle of the portions, and by a repetition of this process the food masses are broken up and thoroughly mixed with the digestive juices. A meal reaches the caecum about $4\frac{1}{2}$ hours, and the entrance to the rectum about 18 hours, after its consumption. *See* Appendicitis; Colitis; Constipation; Diarrhoea; Digestion; Duodenum; Intussusception; Mesentery; Obstruction; Rectum; Visceroptosis.

INTUSSUSCEPTION. This term is used to describe the passage of a part of the intestine into an adjoining part. It takes place most frequently at the ileo-caecal valve, the junction of the small and large intestines. The valve is pushed on into the large intestine, and may pass so far along as actually to protrude at the lower end of the bowel. The large bowel is invaginated, that is to say, its outer surface becomes its inner one.

Acute intussusception is most common in young children, usually during the first year, and is probably due to straining, caused by irritating food. There is severe pain in the belly, which, at first, occurs in spasms, and there is vomiting. There is straining, as if to pass a stool, but only a little blood-stained mucus comes away. Sometimes, however, nothing is passed, but the severe attacks of pain and also the prostration which ensues point to urgent trouble. An operation is necessary to rectify the condition. Warm enemata sometimes push back the bowel, but cannot be depended on.

Chronic intussusception usually occurs in adults, and the symptoms are not so urgent, until perhaps acute obstruction or acute peritonitis occurs. The treatment of the chronic type is also by operation. *See* Intestine.



INTUSSUSCEPTION. Portion of bowel telescoped into adjacent portion

INUNCTION. The administration of oils and fats, and drugs incorporated with them, by rubbing them into the skin, is described as inunction. Blue ointment is sometimes used in this way in the treatment of syphilis, a fresh surface of skin being selected each day, so as to avoid undue irritation by the drug. Cod-liver oil can also be given in this way. For infants, a piece of flannel saturated with the oil may be placed beneath the binder ; the movements of the child will rub in the oil. *See* Ointment.

INVALID COOKERY. Great care must be exercised in the choice, preparation and serving of articles of diet for the invalid and the convalescent. Not only must food be prepared in such a manner as to render it easy of digestion, but its nourishing properties must be retained and even supplemented, and it must be taken to the sick-room in so attractive a form that it will appeal to the eye as well as to the palate of a patient. The best materials must always be used for an invalid's food, and the best methods of cooking it should be studied.

A patient may be ordered " a little boiled fish " as a light, digestible dish, but good sick-room cooks know that to boil fish is to take away much of its nutriment and its flavour. It ought always to be steamed in a little milk, which can be thickened with flour and poured over the fish. All fish, poultry and meat ordered for the sick-room should be steamed.

Food which is meant to be hot, such as beef tea, soups or gruel, must be taken to the sick-room very hot (unless otherwise ordered by the doctor), and cold food, such as milk and jellies, must be kept absolutely cold, on ice during hot weather, as nothing is more unappetising than lukewarm food.

The caprices and peculiarities of patients must be studied. In some cases, when a liberal milk diet is ordered the patient rebels, even to the point of active sickness, but will welcome and enjoy and digest milk if it is merely flavoured with such simple things as a tablespoonful of coffee, a teaspoonful of meat extract, or a pinch of cinnamon, or if it is thickened with a little arrowroot, or diluted with soda or potash water. Eggs are disliked by others, but these can usually be taken and relished if made into a light custard or steamed soufflé or omelette. In cases of debility they should be given raw, well beaten up in warm milk, sweetened, and either brandy or a few drops of flavouring added.

Food must never be allowed to stand in the sick-room, and after the patient's meal is over anything left must be removed. *See* Arrowroot; Barley Water; Beef Extract; Beef Juice; Beef Tea; Beverages; Calf's Foot Jelly; Chicken; Convalescence; Diet; Egg; Nursing; Sweetbread.

IODINE. An element forming dark, lustrous scales, iodine is extensively used in medicine in various preparations. The strong tincture is painted on the skin as a counter-irritant (q.v.). Its action being sufficient sometimes to cause blistering, a common practice is to use equal parts of the strong and of the weak tinctures. This mixture, or the weak tincture, may be used as an antiseptic paint to prepare the skin for operation. The weak tincture may also be painted on chilblains, or on the gum, after it has been dried, for the relief of toothache.

Iodine ointment, or a stainless iodine ointment, such as iodex or the unguentum iodi denigrescens, B.P.C., are used for various skin diseases requiring stimulating or antiseptic treatment, and for rubbing into the skin over chronically inflamed joints and in muscular rheumatism. The absorption of inflammatory products in joints and muscles is thus hastened.

The weak tincture is used inwardly in doses of 2 to 5 minims. Larger doses tend to cause irritation of the stomach and vomiting. Usually, however, for internal use, potassium iodide or sodium iodide, the dose of each of which is 5 to 20 grains, is employed. Preparations of iodine are given for the lesions of the tertiary stage of syphilis, for aneurysm, for chronic bronchitis with a tough, adhesive sputum, for asthma, for chronic joint complaints, and as antidotes for poisoning by lead or mercury.

The tincture may be swallowed accidentally. An emetic should be given, and then thin starch, arrowroot or bread, freely.

Iodine is normally present in the body in organic combination in the secretion of the thyroid gland (q.v.).

IODOFORM. A lemon-yellow crystalline powder, with a characteristic odour, iodoform is used as an antiseptic. A powder consisting of one part of iodoform to three parts of boracic acid is used for dusting wounds or sores, or iodoform may be used alone. Suppositories containing it are used in treating anal fissure and inflamed piles, and bougies for gonorrhoea. There is also an iodoform ointment.

Gauze impregnated with iodoform is a common surgical dressing. A paste consisting of one part of pure bismuth subnitrate, two parts of iodoform, and one part of liquid paraffin, referred to as B.I.P.P., has been used for packing wounds and acute abscesses after they are opened. The drug has been given inwardly in small doses as an intestinal antiseptic.

Poisoning by Iodoform. Either when swallowed, or from absorption from a large raw surface, iodoform poisoning may occur. There may simply be a persistent taste and smell of the drug, or this may be followed by fever, a rapid pulse, headache, delirium, vomiting and collapse. The use of the drug should be discontinued and any surface to which it has been applied be treated with a solution of bicarbonate of sodium in water. Bromides and other sedatives are given.

IONISATION. When common salt, or sodium chloride, is dissolved in water, a change occurs in it. In the solid state a molecule, the smallest amount capable of independent existence, consists of an atom of the metal sodium and an atom of chlorine gas joined together. But when dissolved in water there is a dissociation of the molecule into the constituent atoms, but the atom of sodium carries a positive charge of electricity, and that of chlorine a negative one. This is called ionisation, and the changed atoms are termed ions. If now a current of electricity is passed through the liquid by dipping electrodes connected with the poles of a battery into it, there will be a flow of the sodium ions to the negative electrode and of the chlorine to the positive, that is, the ions are attracted to the electrode having the opposite kind of electricity, and repelled from that having the same kind.

Acids, salts and bases, when dissolved in such solvents as water or alcohol, all act in this way, and advantage is taken of this in introducing drugs into the body. Metals, alkalies and alkaloids are drawn towards the negative pole, acid radicles to the positive.

Ions are driven into the superficial tissues only, being prevented from going very deeply by the fact that they are caught up by the lymph stream and carried away. Cocaine may, however, be directed into a painful nerve, chlorine and salicylic ions into the structures around joints, and zinc ions into septic tissues.

IPECACUANHA. Preparations of ipecacuanha root include the powdered root itself, dose 15 to 30 grains; a liquid extract, $\frac{1}{2}$ to 2 minims; ipecacuanha wine, 10 to 30 minims as an expectorant, and 4 to 6 drachms as an emetic; compound ipecacuanha or Dover's powder, 5 to 15 grains; pill of ipecacuanha and squill, 4 to 8 grains; ipecacuanha lozenges, $\frac{1}{4}$ grain in each; lozenges of ipecacuanha and morphine, $\frac{1}{12}$th of a grain of the former and $\frac{1}{36}$th of a grain of the latter in each; emetine; and emetine bismuth iodide.

Ipecacuanha is a depressant to the central nervous system. In small doses it is an expectorant, in larger doses an emetic, and in larger doses still it causes severe vomiting, purging and collapse. Doses of 1 minim of the wine may relieve vomiting, however. For bronchitis, the wine, the pill, one of the lozenges or Dover's powder may be used. The last is a useful remedy at the beginning of a common cold, as, in combination with the opium in the powder, the ipecacuanha increases sweating.

As an emetic ipecacuanha acts slowly, and is not very suitable for urgent poisoning; it is useful when the bronchial tubes are filled with secretion during bronchitis and breathing is difficult, as vomiting helps to empty the tubes. A teaspoonful may be given to a child and repeated several times if necessary.

Emetine is used in treating amoebic dysentery, from twelve to fourteen daily hypodermic injections of 1 grain being given as a rule. *See* Cough; Dysentery.

IRISH MOSS. Carrageen, or Irish moss, which is a seaweed. is used to make a demulcent drink. This is also slightly nutritive, The most convenient preparation is the decoction of Irish moss, B.P.C., the dose of which is 1 to 4 ounces.

IRON. The metallic element ferrum, or iron, is a normal constituent of the body. It is found chiefly in haemoglobin, the red colouring matter of the blood corpuscles, which enables these to act as oxygen carriers. A considerable amount of this colouring matter is constantly being broken down and excreted in the urine and faeces, so that it is necessary to replenish the stock of iron by taking foods which contain it. It is found both in animal food and in many vegetable foods.

In disease, however, when there is a deficiency of iron, some preparation of it must be given to supplement what is contained in food. There are numerous preparations, and a choice is determined largely by the tolerance exhibited by the stomach.

Iron pills, commonly called Blaud's pills, which are given in doses of 5 to 15 grains, are good if freshly prepared; otherwise they may pass through the bowel intact. These pills can also be obtained in tablet form. Iron lozenges, containing 1 grain each of reduced iron, are given in doses of 1 to 5 grains. Ferrous sulphate, which forms pale green crystals, is given in solution in doses of 1 to 5 grains, and is often combined with doses of magnesium sulphate. It is an astringent preparation. It is contained in the compound iron, or Griffith's mixture, dose ½ to 1 ounce, which is often used for amenorrhoea. The scale preparations—so-called because they form crystalline scales—are not astringent. The dose of each is 5 to 10 grains in solution.

Solution of perchloride of iron and tincture of perchloride of iron, or steel drops, are given in doses of 5 to 15 minims. Solution of dialysed iron, which, for ordinary purposes, has a dose of 10 to 30 minims, is given in doses of 1 ounce as an antidote in arsenic poisoning. Syrup of phosphate of iron, dose ½ to 1 drachm, syrup of iron phosphate with quinine and strychnine, or Easton's syrup, dose ½ to 1 drachm, syrup of iodide of iron, dose ½ to 1 drachm, and compound syrup of iron phosphate, B.P.C., or chemical food, dose ½ to 2 drachms, make good general tonics. The last is often given with cod-liver oil, especially for children. The Syrup of iodide of iron is valuable in osteo-arthritis.

The chief use of iron is for anaemia of the chlorotic type, in which the haemoglobin content of the corpuscles is diminished, rather than the number of the latter. After a haemorrhage, however, iron seems to stimulate the production of fresh corpuscles. Perchloride of iron is a useful drug in some kinds of tonsilitis and as a spray in laryngitis. In large doses of the tincture it has long been used as a remedy for erysipelas. The strong solution of perchloride of iron is used to arrest bleeding.

Astringent preparations of iron may injure the teeth, and to prevent this the dose may be sucked up through a glass tube or a straw, or the mouth should be rinsed immediately with water. *See* Anaemia ; Blaud's Pill.

ISCHAEMIA. A local anaemia, or lack of blood, may be called ischaemia. It is due to interference, by pressure or otherwise, with the flow of blood through an artery, and if severe may cause the death of the tissue affected. Ischaemia may occur from splints being too tightly applied, though it may also occur where there is no interference by apparatus or otherwise and purely from the nature and extent of the injury, and may interfere with the nutrition of the muscles, causing them to become shortened—ischaemic contracture.

When splints have been applied, the state of the circulation may be tested by pressing on one of the nails and letting go. The pressure causes the nail to become white, but, if the circulation is good, the pink colour returns at once when pressure is removed. Over-tightness of splints is also suggested by coldness or blueness of the exposed part, and by a sensation of pins and needles. *See* Fracture ; Gangrene.

ITCH. *See* Scabies.

ITCHING. Pruritus, or itching, appears to be due to irritation of the fine terminations of the sensory nerves, and this irritation may be due to a large number of causes. Some people have itching from wearing wool or flannel. The application of some chemical substances to the skin is liable to cause itching, and even an excessive use of soap may have this effect. Parasites, especially lice and the acarus scabiei or itch-mite, are a common cause, also the bites and stings of insects. Itching may be a symptom of many skin diseases.

Abnormal states of the blood, such as occur in diabetes, gout, digestive disturbances, chronic constipation and jaundice, may also cause it, and in some people the taking of such drugs as morphine, belladonna and arsenic. It may likewise occur in certain diseases of the nervous system.

Sometimes it occurs without any assignable cause, a well-known instance being pruritis senilis which afflicts elderly people, and although in pruritus ani, or itching round the orifice of the bowel, some definite cause, such as piles, fissure or the presence of threadworms, can often be established, it is sometimes impossible to explain the symptom. Similarly, pruritus vulvae may be found to be due to sugar in the urine or to leucorrhoea, or whites, but there may be no such explanation.

Itching is usually worse at night when the patient is warm in bed, and may, in fact, be caused by excessive heat; stokers and cooks are prone to it for this reason.

The first step in treatment is to determine the cause, if possible, as the substitution of cellular cotton or silk underwear for flannel or wool, or the use of cotton or linen sheets in bed, or the destruction of parasites may be all that is necessary to do. Treatment may be directed to any general or local disorder.

General itching may be relieved, at any rate temporarily, by a warm alkaline bath, made by dissolving 6 ounces of washing soda, or 8 to 12 ounces of bicarbonate of potassium, in a bath of about 30 gallons; or the body may be sponged with a lotion of bicarbonate of sodium, a heaped teaspoonful in a quart of water. Rubbing the skin with a menthol cone which has been dipped in spirit is another good method.

In eczema, and especially the dry variety, relief may be got by painting on the following every few hours:

Starch powder	360 grains
Talc	360 grains
Dilute solution of lead subacetate	1 ounce
One per cent of boracic acid in water ..	1 ounce
Glycerin..	½ ounce
Camphor water..	2½ ounces

To be well shaken before use.

This lotion may also help in itching from other causes. Carbolic acid lotion, 1 part in 80, and dilute solutions of ichthyol or of tar, are amongst other remedies used. A cream consisting of 30 grains each of prepared calamine and zinc oxide, 3 drachms of lime water, and almond oil to 1 ounce, may have a more prolonged effect than a lotion.

For pruritus ani, when no definite cause can be found, a weak, continuous electric current or diathermy may be of use. *See* Basilicon Ointment; Dermatitis; Eczema; Eucaine.

JABORANDI. Preparations of jaborandi leaves increase the flow of saliva, sweat and other secretions. This action is due to pilocarpine, an alkaloid contained in them, and the drug is now mostly administered in the form of a salt of this alkaloid, usually the nitrate. In Bright's disease, when uraemia threatens, a hypodermic injection of a pilocarpine salt may avert the danger by causing profuse sweating.

A solution of a pilocarpine salt, when dropped into the eye, causes the pupil to contract, and this action is utilised in glaucoma (q.v.) and often after eye examinations, to avert the risk of this disorder when mydriatic drugs have been used. Pilocarpine has also a reputation as a hair restorer.

JACKET. To give support to the spine, what is known as a spinal jacket may be worn. This is often made of plaster of Paris bandages, but poro-plastic, a porous material which is much lighter than plaster of Paris, non-inflammable celluloid, which is also light, and occasionally leather, are also used. While the jacket is being applied or fitted, as the case may be, the spine is kept extended by suspension from a tripod or otherwise. An important requisite in such a jacket is that it should be well applied to the pelvis and give support from there. It is chiefly used in cases of tuberculosis of the spine. A pneumonia jacket designed to lessen the risk of chill in respiratory complaints is made of Gamgee tissue (*see* Plate 49).

JACONET. A thin waterproof material consisting of linen treated with rubber on one side, jaconet forms a useful covering for a fomentation or poultice. A piece of jaconet may be used to keep dressings dry and clean, and to keep the patient and the bed dry during such procedure as washing wounds, syringing, etc.

JALAP. A drastic purgative, producing copious watery stools, jalap may be taken in powder, in doses of 5 to 20 grains. It is, however, often taken as the compound powder of jalap, which contains also acid potassium tartrate and ginger, and is used in doses of 20 to 60 grains. Jalap is especially useful in getting rid of dropsy.

JAUNDICE. The existence of jaundice is shown when both the skin and the white of the eyes are yellow. The tint of the skin may vary from bright lemon-yellow to dark olive-green, and there may be itching, particularly if the condition has lasted for some time, when itching may be severe. The urine is dark in colour, and the stools may be clay-coloured and offensive, more or less natural in appearance or dark-coloured, according to the cause of the jaundice. For jaundice is not a disease in itself, but merely a symptom of a variety of conditions.

Bile, which is formed by the liver-cells, makes it way through ducts into the first part of the small intestine, the duodenum, and, if its passage is prevented, it is absorbed into the blood and gives rise to jaundice, this type being called obstructive jaundice. The obstruction may be due to an inflammatory swelling of the lining of the ducts themselves, constituting catarrhal jaundice; to blocking of the duct by a gall-stone (q.v.), or occasionally by a parasitic worm; or to pressure on the ducts by a growth in any of the adjoining viscera, most commonly a cancer of the pancreas.

Catarrhal jaundice usually follows indigestion, and represents extension of catarrh from the duodenum into the bile ducts. Besides the signs of jaundice, the tongue is furred, and there may be pain or heaviness in the pit of the stomach or over the liver; the appetite is poor, or there may be sickness and vomiting. The pulse-rate may be very slow. There is often also great depression of spirits. These symptoms may pass away in a fortnight, but sometimes the catarrh settles down into a chronic state, or such may develop independently of an acute attack.

Acute catarrhal jaundice is treated by putting the patient to bed, where, generally speaking, he should remain till bile is passing freely into the bowel again, as will be shown by the stools. A large linseed poultice or fomentation may be placed over the stomach and liver, especially if there is discomfort. The bowels are usually cleared at the beginning with 1 grain of calomel at bedtime and a teaspoonful of sodium sulphate in half a glass of water first thing in the morning, the salts being repeated each morning till the motions are normal.

The diet should be limited to milk and hot water at first, and it is an advantage to put a pinch of bicarbonate of sodium in the drinks as it helps to liquefy bile. This purpose may also be served by giving 10 grains of sodium salicylate, thrice daily, dissolved in a little water. After a few days milk puddings and gruel may be added, and, when recovery has begun, white fish and chicken. Fat should be kept out of the diet.

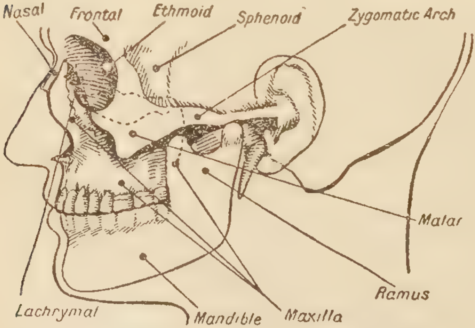
When convalescent, the following may be given:

Dilute nitro-hydrochloric acid	1½ drachms
Glycerin	4 drachms
Compound infusion of gentian to	6 ounces

A tablespoonful in a little water, thrice daily, after food.

The diet should also be light during chronic catarrh, and the bowels must be kept open. Easy open-air exercise is important.

There is another type of jaundice which is due to an excessive breaking down of red blood corpuscles, and is, therefore, called haemolytic jaundice. This is due to poisoning of some sort. It may occur in malaria, pneumonia, and other infections. It is a feature of Weil's disease (q.v.). A severe acute jaundice occurs in the disease known as acute yellow atrophy of the liver, or it may indicate the action of phosphorus, trinitrotoluene, or other poisons. *See* Bile; Liver.



JAW. The maxillae and mandible form the greater part of the skeleton of the face and carry the teeth

JAW. The upper jaw consists of two separate bones, the right and the left maxilla, which meet at the middle line, while the lower jaw or mandible is a single bone, fusion at the middle line taking place in childhood. The part of each jaw which carries the teeth is called the alveolar part.

Each maxilla takes a large share in forming the floor of the orbit and the outer wall of the corresponding nasal cavity, and within it is contained the antrum (q.v.), a cavity communicating with the nose and liable to become infected from the nose or from the septic roots of subjacent teeth. The mandible consists of the body, a horizontal part which is arch-shaped and of two perpendicular portions, or rami (singular, ramus), one at each end of the body.

Both the upper and the lower jaws may be broken by direct violence. A fracture of the mandible is practically always compound and there is bleeding from the mouth. First-aid treatment is given under the heading Fracture. Dislocation of the lower jaw may occur through a blow on the chin, or through opening the mouth too wide in yawning. Emergency treatment is illustrated in Plate 22.

A spasmodic closure of the jaws, or trismus, is found in tetanus, and this fact accounts for the popular name lockjaw given to this disease, but trismus may be due to irritation from teeth and other causes. *See* Antrum ; Lockjaw.

JOINT AND GENERAL JOINT DISEASES

Important Agents in the Mechanics of the Body

Although the individual joints are described under their separate headings they have a number of features in common as regards their construction and action in health and their condition in disease. These aspects of the subject are dealt with here. See Cartilage ; Dislocation ; Fracture ; Osteo-arthritis ; Rheumatoid Arthritis

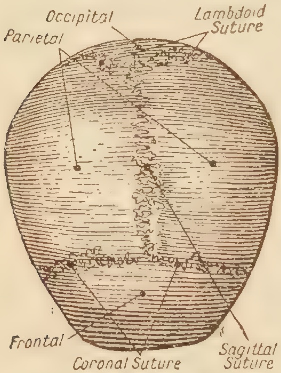
The bones and cartilages of the skeleton form with each other a considerable variety of joints, or articulations. They may be grouped into three main classes : immovable, freely movable, and partially movable joints.

The first class includes the suture, the kind of joint uniting the bones of the cranium, or brain-pan. Here, as in the joint between the two parietal bones, the edge of one bone may be fitted into that of the others by tooth-like projections ; or the edges of the bones are bevelled and overlap one another. A synchondrosis is another type, and here two pieces of bone are joined by a piece of cartilage. An example occurs in growing bones where the epiphysis (q.v.) is joined to the diaphysis.

In the course of life any immovable joint may cease to be a joint at all from bone forming across it, but, apart from disease or injury, this cannot happen to a movable joint. This is distinguished by what is called a joint cavity, within which the ends of the bones move on one another. The ends of the bones where they can come into contact with each other are covered with cartilage. This softens the play of the bones, prevents friction and lessens jarring. The joint cavity is formed by an outer layer of fibrous tissue, the joint capsule, which is lined by a smooth layer, the synovial membrane. These together form an airtight enclosure, and the smoothness of the synovial membrane, which is increased by the presence of a clear, thick lubricating fluid, the synovia, secreted by this membrane, also prevents friction during the movements of the joint. Besides these structures, there are strong fibrous bands, or ligaments, which assist in keeping the ends of the bones in apposition, usually outside, but in some instances actually inside, the joint.

The movements which can be performed at a joint depend upon the shape of the bony parts entering into it, and so a number of varieties of movable joint can be described. The ball-and-socket joint, represented at the shoulder and hip, for example, permits the freest movement of all. This type of joint is well shown in the illustration in page 412.

The possible movements at a joint are abduction and adduction, movement respectively away from and towards the middle line of the body or a limb; flexion, or movement towards the front, or ventral, aspect of the body; and extension, or movement towards the back, or dorsal, aspect of the body. In addition, at a ball-and-socket joint there is rotation on the longitudinal axis; this happens at the hip, for instance, when the toes are made to point inwards or outwards.



JOINT. Suture, an immovable joint, uniting bones of cranium

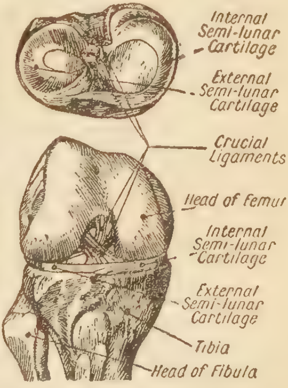
The third class of joints, those capable of partial movement, is exemplified by the joints between the bodies of the vertebrae and the symphysis pubis. Here the apposing bones are covered with cartilage, but there is also, separating them, a plate of fibro-cartilage within which is a rudimentary joint cavity. The bones are held together by ligaments. This arrangement must be distinguished from what occurs in some movable joints, such as the knee and that connecting the thumb with the hand, in which there are also plates of cartilage interposed between the ends of bones. These plates, however, have the effect merely of permitting a closer apposition between the bony ends. In the knee the plates are called semilunar cartilages, while those in other joints are referred to as articular disks. The rounded prominences at the articular ends of some bones are called condyles.

Injuries and Diseases of the Joints. A wound penetrating into a joint cavity is dangerous because septic bacteria multiply very readily in the cavity. The fact of penetration may be disclosed by oozing of the thick yellow synovial fluid.

Violence applied to a joint may cause varying degrees of injury. The joint may be sprained, that is, portions of the ligamentous attachments are stretched or torn, or the bones may be partially or completely displaced from contact with one another, the former of these accidents being called a partial dislocation, or subluxation, while the latter is a dislocation, or luxation. At the knee, however, the injury might otherwise be displacement, bruising or fracture of a semi-lunar cartilage. Immediately after a sprain full movement will be possible at the joint, though it may be resisted by the patient on account of pain. Treatment is dealt with under the heading Sprain.

A dislocation (q.v.) of a joint causes immediate deformity of a greater or lesser degree, according to the size and position of the joint, and voluntary movement at the joint is impossible, or, at any rate, is seriously impaired. When one of the limb joints is dislocated, the first-aid treatment is to apply cold cloths and rest the part, with splints if necessary. A sling should be used for the upper extremity. If the dislocation is of one of the joints of the lower extremity, the patient should be kept lying down, as also, whatever joint is dislocated, if there is evidence of shock, such as faintness, pallor and chilliness, he should also be kept warm. The reduction of the dislocation should be left to a doctor, as unskilled attempts might increase the damage.

Inflammation of a joint may be limited to the synovial membrane or practically so, when it is called synovitis, or it may involve all the structures of the joint, when it is called arthritis. Acute synovitis may be due to cold or an injury ; sometimes it is due to the presence of a loose body, such as a piece of cartilage or bone which has been detached in the joint, and which from time to time gets between the surfaces of the joint, causing locking, severe pain and synovitis. Acute synovitis causes pain and swelling of the joint, and, following injury, there will probably be discoloration from effused blood. The treatment is that laid down for sprain. Synovitis due to some constitutional disorder demands primarily treatment for this disorder. The joint should be rested and treated with hot applications or be wrapped up in cotton wool. When the acute stage passes off, movements, massage and a liniment are used to promote absorption of the fluid and flexibility of the joint. Attention to the muscles acting on the joint is important, as, according to its severity, inflammation in a joint is always followed by wasting of the muscles.


Internal Semi-lunar Cartilage
External Semi-lunar Cartilage
Crucial Ligaments
Head of Femur
Internal Semi-lunar Cartilage
External Semi-lunar Cartilage
Tibia
Head of Fibula

JOINT. Plates of cartilage and crucial ligaments in the knee

Acute synovitis may assume a chronic form or this may exist as such from the beginning, when the cause has not been sufficient to set up severe inflammation. There may not be much pain, but the joint is weak. There is more or less fluid present as a rule. The movements of the joint are interfered with as regards ease and possibly extent also. Blistering and the pressure of an elastic bandage may do good, also hot-air or other baths or diathermy. Operative treatment may be necessary, however.

Acute arthritis is due to bacteria invading the joint, except when such a disease as gout or trauma is the cause. The bacteria may be of the septic type, when suppuration is likely to occur, and if a large joint is involved the patient's life is endangered. Other microbes, such as those of typhoid fever, dysentery, gonorrhoea or pneumonia, may be responsible, however. As in the more limited condition of synovitis, there is swelling of the joint and pain, which is severe; merely to touch the limb or shake the bed may occasion intolerable agony. There is likely to be a considerable degree of fever. The skin over the joint may be oedematous, and, if suppuration occurs, the pus, or matter, finds its way to the surface by one or more routes, resulting in the presence of discharging sinuses.

In any arthritis, owing to the destruction of cartilage, etc., there is always an imminent risk of ankylosis or fixation of the joint, and if this should take place in an awkward position the utility of a limb may be sacrificed. When effusion occurs into the joint, in synovitis or in arthritis, the joint tends to assume the position of greatest ease, and generally this means that it becomes somewhat flexed, or bent. If the inflammation in the joint is severe, the ligaments and other structures binding the ends of the bone together become softened, and partial dislocation may occur, or the limb may be rotated on its long axis. It is necessary therefore, when there is any risk of ankylosis, to fix the joint in the best position for future service, and for various joints these positions are as follows (*see* Plate 36.)

Shoulder, the upper arm making an angle of 50° with the vertical, and the elbow slightly in front. *Elbow*, at an angle of 70°, or, if both elbows are affected, one at this angle and the other at an angle of 110°; the latter is the better position for working and the former for the patient feeding himself. The forearm is placed so that the thumb points upwards or slightly outwards. *Wrist*, with the hand drawn backwards, or, at least, in line with the forearm. *Hip*, with the thigh in line with the side-to-side plane of the trunk, but drawn a little outwards from the middle line of the body, and the toes pointing somewhat outwards. *Knee*, with the lower limb straight, or very slightly bent. *Ankle*, with the foot at right angles to the leg and the sole directed slightly inwards.

The general condition of the patient requires urgent attention, and treatment will include that for the state of fever (q.v.) generally, and probably also the use of vaccines or sera to combat the activities of the microbes concerned.

Tuberculosis is a common cause of chronic arthritis, and the disease may begin either in the synovial membrane or the bone; in children it almost always begins in the epiphyseal cartilage. It may be necessary for the treatment of a tuberculous joint to evacuate an abscess and remove diseased tissue, but more con-

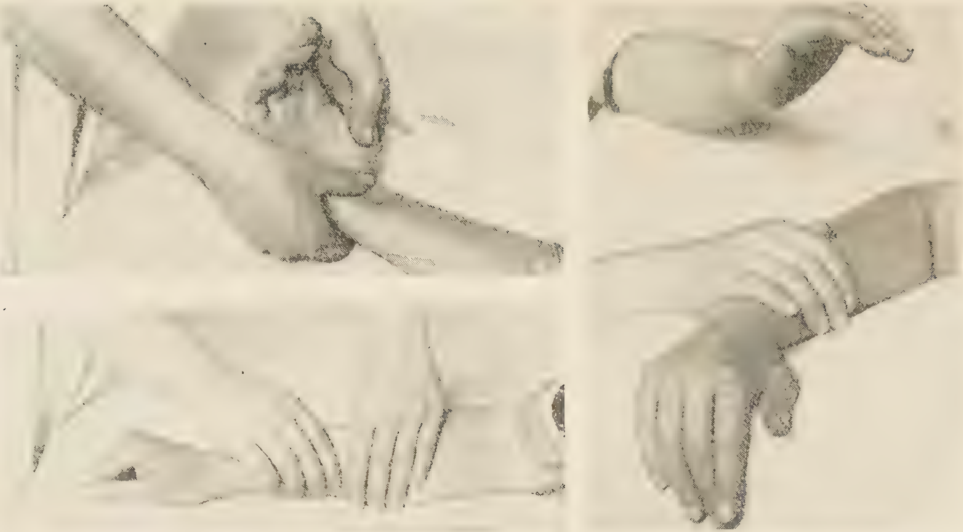
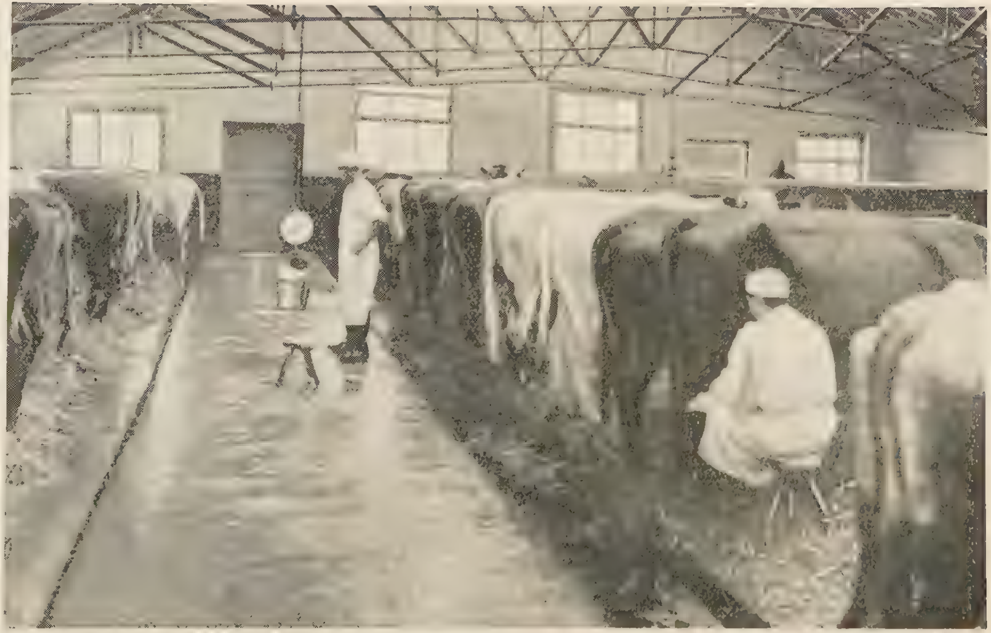


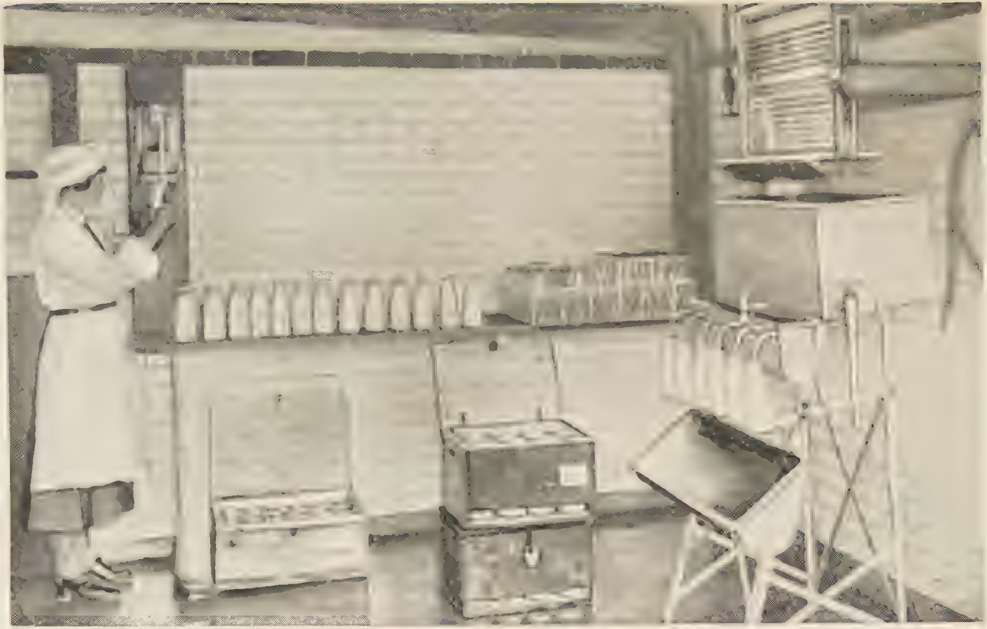
Fig. 4. Friction for reducing thickenings. Fig. 5. Skin rolling for treatment of fibrous tissue and fatty deposits.
Fig. 6. Clapping, for improving cutaneous circulation

MASSAGE : FURTHER INSTRUCTIONS IN THIS HEALING PROCESS



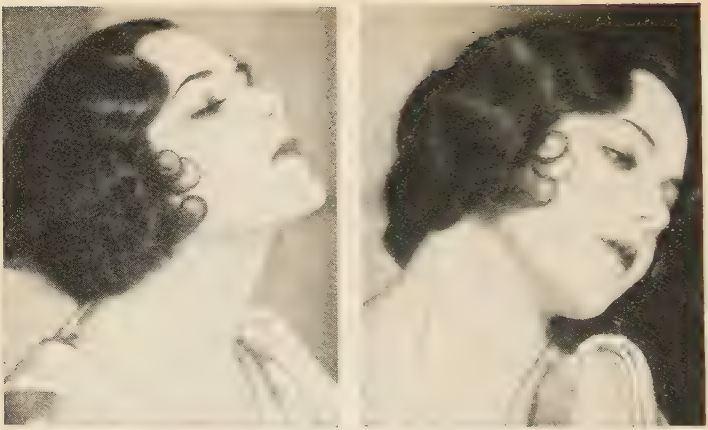
The cowshed of a Rayleigh model farm. The walls are of glazed brick and the stalls are slightly sloping to facilitate sluicing. The cows are inspected at frequent intervals and their flanks, udders and teats are cleansed before milking. The milkers wear clean overalls and caps.

HYGIENIC CONDITIONS IN A MODERN COWSHED

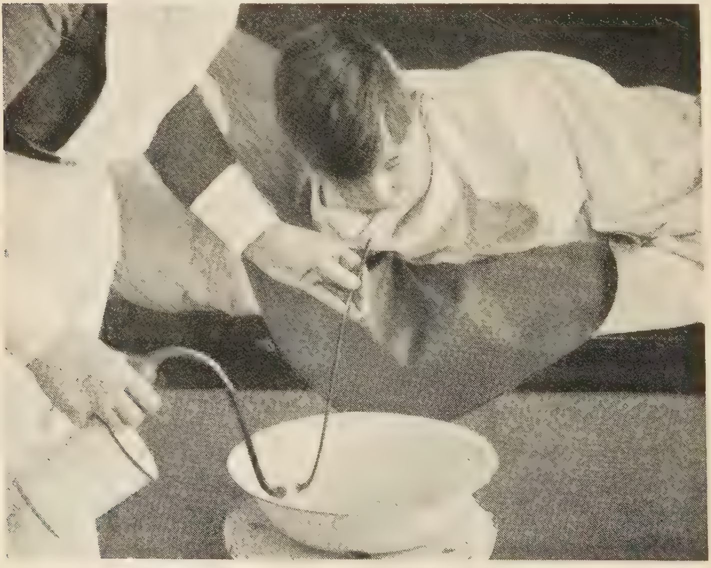


[illegible] Sealing (left) is done mechanically, the hands never touching the mouth of the bottle

THE BOTTLING DEPARTMENT IN AN UP-TO-DATE DAIRY



Neck. Movements for promoting suppleness and improving contour. Left. Tilting the chin backwards slowly till the neck muscles are taut, repeating several times. Right. Rotating the head slowly brings every muscle of the neck into action



Scarlet Fever. Purulent discharge may be cleared out of the nose by gentle douching using a Higginson's syringe, to which is attached a piece of soft, narrow tubing

BENEFICIAL TREATMENT FOR NECK AND NOSE

servative methods of treatment, namely, rest, fresh air, sunlight and feeding, are now thought to be the best routine treatment.

Chronic arthritis may also be caused by syphilis, and by the organisms mentioned above as causing the acute disease. It may be due to poisons absorbed from septic teeth, from a diseased appendix or from some other focus. It may occur from physical injury, or from metabolic changes. Rheumatoid arthritis and osteo-arthritis are described under their own headings. In treating chronic joint disease not due to definite causes, such as gout, tuberculosis or syphilis, it is necessary to search for any focus of infection and clean it up. Rest, or, on the other hand, movement may be needed, and liniments, massage, ionisation, diathermy, hot air baths, light baths and electrical treatment are other useful methods of local treatment. A generous, varied diet with cod-liver oil and other tonics may be required to build up body-energy, and attention to morale must not be neglected ; an attitude of chronic invalidism must be combated. Climatic and spa treatment are often helpful.

JUGULAR VEIN. Most of the venous blood from the interior of the skull drains into the sigmoid sinus on each side, which, through an opening in the skull, becomes continuous with the internal jugular vein. This passes down the neck along with, but on the outer side of, the carotid artery and unites with the subclavian vein to form the innominate vein. On each side of the neck there are also the anterior and the external jugular veins. These lie just below the skin. Bleeding from the internal jugular vein is very dangerous. *See* Innominate ; Neck.

KALA-AZAR. A febrile disease occurring in the East and along the shores of the Mediterranean, kala-azar is due to a general infection with Leishman-Donovan bodies, minute animal parasites belonging to the protozoa. This parasite is transmitted by a sand-fly and possibly by other insects. There is remittent fever, which at first may suggest malaria or enteric fever, and the spleen and liver are enlarged. The parasites may be discovered in blood drawn from either of these organs. The disease can be cured by injections of the tartrate or other preparations of antimony.

KELOID. Over-growth of scar-tissue gives rise to a keloid. Instead of shrinking like an ordinary scar, it not only remains prominent but tends to send prolongations along the skin like the claws of a crab. The surface may be white but more often remains pink. Keloid formation is more common in anyone suffering from tuberculosis. The best way of removal is by exposure to sunlight, X-rays or radium. *See* Scar.

KERATITIS. Inflammation of the cornea, or keratitis, may be superficial, or in the substance of the cornea, that is to say, interstitial. There is more or less cloudiness of the structure and there may be redness from the presence of blood vessels ; sometimes there is ulceration. Keratitis punctata consists of deposits of lymph towards the back of the cornea, seen as small spots usually arranged in the form of a triangle, and is secondary to cyclitis or sympathetic ophthalmia. The treatment of keratitis depends on the variety to which it belongs. *See* Cornea; Eye.

KIDNEY. Situated on the upper part of the posterior wall of the abdomen, the kidneys, of which there is one on either side of the spine, are partly covered behind by the last ribs, the left being placed rather higher up in the body than the right. A kidney has a characteristic shape, somewhat resembling a flattened bean, the long axis being up and down, but obliquely, as the lower end of the organ is the farther from the mid-line of the body; the average dimensions are 4 in. long, 2½ in. broad, and 1 in. thick.

Each kidney is embedded in fat, more or less, and coming from the aorta to its inner border, almost at right angles, is the renal artery, while from this border the renal vein passes across to the inferior vena cava. Lymphatic vessels also come from it and the ureter, and nerves enter it. All these structures together constitute the pedicle, or root, of the kidney.

The inner portion of the organ is hollowed out into a sinus, within which is attached a membranous bag, roughly triangular in shape, and known as the pelvis of the kidney. Short tube-like prolongations of this bag, known as calyces, surround nipple-shaped projections, or papillae, on the inner border of the kidney. The discharge ducts in the organ itself open on these papillae, of which there are from six to fourteen, and the urine then passes through the calyces into the pelvis and on into the ureter, which begins at the inner angle of the latter.

In some people, and especially women, the kidney may be more or less freely movable. This has no disagreeable effects, as a rule, but occasionally it leads to kinking of the ureter and a sudden stoppage of the flow of urine. There is severe pain and probably vomiting, which is relieved by the unkinking through the kidney changing its position; this is followed by a free flow of urine. This accident is known as Dietl's crisis, and should it tend to recur the kidney may be retained in position by a properly padded belt or may be fixed in position by an operation.

INJURIES AND DISEASES OF THE KIDNEY. In visceroptosis (q.v.), or sagging of the abdominal organs, one or both kidneys may share in the displacement. By a severe blow, or by crushing, a kidney may be ruptured.

A renal calculus, or stone in the kidney, may be situated in the pelvis, in a calyx or in the substance of the organ. Lithaemia (q.v.), an increase of uric acid in the blood, or other circumstances which increase the concentration of the acid or of certain other substances in the urine, lead to the precipitation of the crystals out of which calculi are formed. Even a large stone may be present in the kidney for a long time without giving rise to symptoms. A dull pain in the loin is common, however, and is likely to be made worse by jolting; sometimes, in order to relieve this pain, a patient bends the body towards the affected side and presses his closed fist into the loin. There may be frequency in passing urine and this may contain pus and blood. A stone in the pelvis of the kidney causes inflammation of this cavity, or pyelitis.

Should a stone of any size pass into the ureter it gives rise to renal colic, spasms of excruciating pain which shoot down to the front of the thigh and, in the male, to the testicle. Associated with this there is shock and vomiting. Sudden relief comes from the stone slipping into the bladder or back into the pelvis of the kidney. Should the stone become stuck, or impacted, in the ureter, it causes arrest of the action, or anuria, of the affected kidney, if the obstruction be complete; if this is incomplete, there is hydro-nephrosis, or an accumulation of urine in the passage above the obstruction. If there is a large amount of pus in the retained fluid, the condition is described as pyonephrosis. The diagnosis is helped greatly by the use of X-rays (*see* Plate 37). Treatment is directed to the lithaemia, but operation may be necessary. Renal colic is treated by placing the patient in a hot bath or hip-bath and, if necessary, injecting morphine; the inhalation of chloroform is sometimes necessary.

Inflammation of the kidney substance, or nephritis, is described under the heading Bright's Disease. Septic infection may involve both the pelvis and the kidney substance; this is called pyelo-nephritis. From such infection an abscess may form in or outside the kidney. This must be opened and drained.

Tuberculous disease may affect one or both kidneys and may be due to the disease spreading upwards from the bladder, or occur independently. The symptoms rather resemble those of stone in the kidney, but a proper examination of the urine is likely to reveal the presence of tubercle bacilli in it. The treatment is that for tuberculosis (q.v.) generally, and tuberculin injections are sometimes useful. If the disease be limited to one kidney it may be removed.

KNEE. To form the knee joint the lower end of the femur rests on the upper surface of the head of the tibia. On this surface there are two areas, an inner, which is oval, and an outer, circular, for the reception of the internal and the external condyle of the femur respectively, these areas being separated by an elevation of the bone known as the spinous process. To this spine is attached one of the two crucial ligaments, so called because they cross one another, which are situated in the middle of the joint and which are important factors in strengthening it (*see* illustration in page 447).

The areas above referred to are deepened for additional security by the presence of the internal and external semilunar cartilages, which at their extremities are attached to the tibia. A semi-lunar cartilage may be detached by violence, which usually takes the form of a twist of the leg when the knee is slightly bent. This happens most often to the internal cartilage. The cartilage is not only detached but displaced.

Injury to a semi-lunar cartilage causes great pain and more or less locking of the joint, which shortly swells up from the accumulation of fluid due to synovitis. As soon as possible after the accident the cartilage should be replaced in position, under a general anaesthetic if necessary. The limb is then rested and hot applications applied in order to remove the inflammation and the fluid. The pressure of an elastic bandage is useful here. Movements of the joint are begun early, but a supporting bandage should be worn when the patient begins to get about (*see* Plate 38).

The only movements normally possible at the knees are flexion and extension. Extension is brought about by the action of the powerful group of muscles on the front of the thigh, described together as the quadriceps extensor. In the ligament by which the quadriceps is attached to the tibia is the small, rounded bone, known as the patella, or knee-cap, the inner surface of which moves on the front of the lower end of the femur. Flexion is mainly due to the hamstring muscles on the back of the thigh.

Inflammation of the joint may weaken the ligaments and make lateral movements possible, and also the end of the tibia may become movable backwards and forwards on the femur when the limb is fully extended. This causes more or less instability of the joint in walking or even standing, and a support of some kind may require to be worn on the knee.

A person who is bedridden because of knee-joint disease requires careful watching and treatment to prevent displacement of the head of the tibia from taking place, as the hamstrings tend to bend the knee, the weight of the tibia to make this bone sag backwards, and the weight of the foot to rotate the leg outwards. This must be prevented by proper splints.

Between the tendon of the quadriceps and the front of the head of the tibia there is a small bag, or bursa, which lessens friction, and then another, the patellar bursa, between the tendon, the anterior surface of the patella and the skin. It is the accumulation of fluid in the latter, owing to bursitis (q.v.), that constitutes housemaid's knee. This is caused by pressure and so may occur in any person who kneels much. It may be prevented by the use of a cushion.

Knock knee, or genu valgum, is the condition in which the knee is bent inwards towards the middle line of the body, the foot being carried outwards and the toes turned out more than usual. Usually both limbs are affected. It occurs in early childhood from rickets, but may affect a young person with weak ligaments, a condition frequently associated with general debility, or one who does much weight-carrying or habitually adopts a faulty posture in standing. There is usually also flat foot, and the existence of this would predispose to knock knee. In the earlier stages only the soft parts of the joint are involved, and the condition may be rectified by manipulation and a correct alinement preserved by splints or leg-irons; but when the deformity is of some standing, bony changes have occurred, so that it becomes necessary to break through the lower end of the shaft of the femur in order to make the limb straight. The region at the back of the knee is called the popliteal space. *See* Bow Leg; Bursitis; Dislocation; Femur; Hip; Joint; Patella; Rickets; Tibia.

KNEE JERK. In a healthy person, if the tendon connecting the patella with the shin bone is put on the stretch, say, by crossing one leg over the other, and is smartly tapped with the edge of the hand, the foot is kicked forwards. This is referred to as the knee jerk and is an example of a deep reflex; its existence depends on the integrity of the nervous circle, comprising the nerve from the tendon or extensor muscles to the spinal cord, nerve centres in the cord and nerves from these to the extensor muscles. The knee jerk is absent in locomotor ataxia and other diseases in which the sensory path is diseased, and if the motor path is diseased, as when infantile paralysis affects the muscles on the front of the thigh, again it is absent. *See* Nervous System; Reflex Action.

KNOCK KNEE. *See* Knee.

KRAMERIA. Rhatany or krameria root, which is obtained from South America, is rich in tannic acid and its preparations are useful astringents. The official preparations are the extract, dose 5 to 15 grains; the infusion, dose ½ to 1 oz.; the tincture, dose ½ to 1 drachm; the lozenge and the rhatany and cocaine lozenge. Krameria is extensively used for spongy gums and relaxed throat. It may be incorporated in a tooth powder, or a teaspoonful of the tincture in a wineglass of water may be used as a mouth wash and gargle.

KYPHOSIS. An abnormal backward curvature of the spine is described as kyphosis, or, popularly hump-back. *See* Backbone; Spinal Curvature.

LACERATION. A tear through the tissues is described as a laceration or a lacerated wound. There is more damage than when the wound is clean, and consequently a greater risk of infection. *See* Wound.

LACTIC ACID. By fermenting lactose, or milk sugar, through the agency of the lactic acid bacillus or certain other bacteria, lactic acid is obtained as a colourless, syrupy liquid. The souring of milk is caused in this way.

Strong lactic acid is used for dissolving the false membrane in diphtheria, tumours and other unhealthy tissue. Dilute lactic acid is sometimes used in catarrh of the bladder, in infantile diarrhoea with green stools and in other disorders. The dose for an adult is ½ to 2 drachms. Various salts of lactic acid are used in medicine, most frequently calcium lactate.

LAMENESS. Many causes, from painful corns to serious joint or nervous disorders, may account for lameness. In children, infantile paralysis and early hip-joint disease are amongst the possibilities to be considered. The state of the footwear may also require consideration in some instances of lameness.

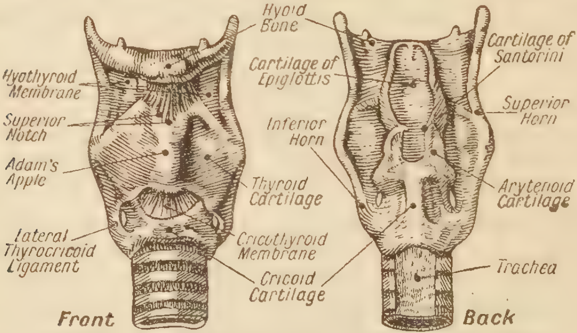
LANOLIN. Adeps lanae, or wool-fat, obtained from the wool of sheep, is a yellowish, sticky substance. Lanolin is used as an emollient, and as a basis for ointments. It has the advantage that it does not become rancid. Its stickness may be lessened by mixing with a little soft paraffin or vaseline.

LARDACEOUS DISEASE. *See* Amyloid Disease.

LARYNGISMUS STRIDULUS. *See* Croup.

LARYNX. The organ of voice, called the larynx, is continuous below with the trachea, or windpipe, and opens above into the pharynx, below and behind the base of the tongue. All air entering or leaving the chest passes through the larynx. The pharynx, at the back of the larynx, becomes continuous with the gullet. Food is prevented from entering the larynx by the latter being drawn upwards under the base of the tongue during the act of swallowing (q.v.). If a person tries to talk as well as swallow, particles may be drawn into the larynx, but, as they cause much irritation they are usually expelled by a bout of violent coughing. This accident is familiarly described as a crumb going the wrong way.

The framework of the larynx is formed by a number of cartilaginous structures. The largest is the thryoid cartilage, a plate which is bent sharply on itself so as to make a V-shaped gutter, the point of the V being in front and constituting the prominence in the neck known as the Adam's apple. Below the thyroid is the cricoid cartilage, shaped rather like a signet-ring, the broad part being at the back. There is a space between the thyroid and cricoid cartilages in front, and this is filled in by the thyroid membrane. It is through this membrane that an opening is made in a sudden emergency when an artificial opening for air becomes necessary.


Hyoid Bone
Cartilage of Santorini
Hyothyroid Membrane
Cartilage of Epiglottis
Superior Notch
Superior Horn
Inferior Horn
Adam's Apple
Thyroid Cartilage
Arytenoid Cartilage
Lateral Thyrocricoid Ligament
Cricothyroid Membrane
Trachea
Cricoid Cartilage
Front
Back

LARYNX. Cartilaginous structures which form its framework

Perched on the upper border of the back part of the cricoid are the two arytenoid cartilages. The vocal cords are stretched between the arytenoid cartilages and the front part of the thyroid cartilage. They are formed of elastic tissue and normally appear as two white glistening bands traversing the larynx. In ordinary breathing they are moderately open, leaving a triangular space, the rima glottidis. For the production of voice the cords come together, leaving only a narrow slit for air, which, by throwing the edge of the cords into vibration, produces sound. The pitch of this varies with the closeness of the cords to one another and with their state of tension. The greater depth of the male voice as compared with the female is due to the larger size of the larynx and consequent greater length of the cords.

For examining the larynx an instrument known as a laryngoscope is used. This consists simply of a little mirror mounted at an angle on a metal stem. The mirror is passed to the back of the throat and light is thrown on it from a mirror on the observer's forehead, or from a light there or one mounted on the handle of the instrument.

DISEASES OF THE LARYNX. Inflammation of the larynx, or laryngitis, may be acute or chronic. Acute laryngitis may be part of a common cold or of such diseases as influenza or measles. It may be caused by inhaling irritating vapours or by swallowing corrosive substances. There is hoarseness, an irritating cough, which brings up a little sticky mucus, some pain on pressing over the larynx and, perhaps, soreness in swallowing. The temperature is raised and the pulse rapid. The voice may be lost altogether and, particularly in children, there may be considerable difficulty in breathing.

The patient should be kept in a warm room, the temperature of which is kept as even as possible. Often it will be desirable to remain in bed. The diet should consist of warm liquids. The patient should refrain from talking. Hot fomentations or poultices over the throat will be useful, and also the use of a bronchitis kettle to keep the air moist; or steam containing Friar's balsam may be inhaled as described under the heading Inhalation.

Chronic laryngitis may follow an attack of acute laryngitis or it may follow over-use or misuse of the voice. It may be associated with chronic inflammation in the nose and throat. Alcoholism predisposes to, and excessive smoking aggravates, the condition. The voice must be rested as much as possible, and those who have to do much public speaking should cultivate an easy style of delivery. Tobacco and alcohol should not be used, nor very hot drinks, condiments or spices. The bowels should be kept regular. Help may be derived by spraying with a solution of perchloride of iron or some other astringent.

The larynx may be subject to some nervous affection either of a sensory or a motor character. Laryngeal spasm may be due to local irritation or in children occur as part of a more general nervous disturbance, causing a form of croup (q.v.). Sudden swelling of the mucous membrane of the larynx may be due to irritation within the organ or to diffuse inflammation, or cellulitis, in the neck. It may occur in diphtheria (q.v.). The risk of suffocation is urgent and medical help should be summoned at once. Meanwhile ice may be sucked and hot applications put round the throat.

Laryngeal tuberculosis is almost always secondary to the same disease in the lungs, infection of the larynx presumably being caused by the sputa from the lungs. The treatment follows the lines of that for consumption (q.v.), with appropriate local treatment. Swallowing may be difficult on account of great pain, but feeding may be much easier if the vessel containing food, which should be liquid, is placed so far below the patient that he has to stoop down and suck the food up through a tube.

Syphilis in an early stage may cause acute laryngitis ; in a late stage it may cause ulceration and destruction of the parts of the larynx. Tumours of the larynx are fairly common and some of them may cause no serious symptoms.

Foreign bodies may be drawn into the larynx and may cause spasm and urgent danger of suffocation. A gulp of water or a slap on the back, if necessary with the patient upside down, may dislodge the object. If this fails and the face is becoming black, the point of a knife may be plunged into the larynx in the middle line of the neck, half an inch, or less in a child, below the most prominent part of the Adam's apple. The edges of the wound are drawn apart by hair-pins. If breathing has stopped artificial respiration (q.v.) should be begun. If, however, the foreign body is not causing urgent choking no attempt should be made by any unskilled person to remove it.

LASSAR'S PASTE. Various formulae are given for Lassar's paste, which is a preparation used in eczema and other skin diseases. The following is a good example :

Zinc oxide	120 grains
Powdered venetian talc	120 grains
Salicylic acid	5 grains
Vaseline	1 ounce

For seborrhoeic eczema, 20 grains of precipitated sulphur can be added, or for acne, 10 grains each of sulphur and resorcin.

LAUDANUM. The tincture of opium (q.v.) is commonly referred to as laudanum.

LAXATIVE. *See* Aperient.

LEAD. Acetate of lead, commonly known as sugar of lead on account of its sweetish taste, is sometimes given in a pill, usually the pill of lead and opium in order to check severe diarrhoea or haemorrhage from the bowel. The compound suppository of lead, which also contains opium, may also be used.

As local applications, preparations of lead are astringent and sedative. The strong solution of lead subacetate or Goulard's extract, is used mainly for making the dilute solution, or Goulard's water. This, often referred to simply as lead lotion, is used to relieve itching and reduce inflammation and discharge in affections of the skin and mucous membranes. Used as a local sedative the ointment or the glycerin of lead subacetate will sometimes be more suitable than the lotion.

Lead plaster, also called diachylon, or litharge, plaster, is used when not only a sedative but a supporting action is required. It is used as a basis for many other plasters, including resin and soap plaster. A mixture of equal parts of lead plaster and soft paraffin, or vaseline, is known as Hebra's diachylon plaster.

POISONING BY LEAD. Lead lotion may be taken accidentally, or liquor or food may contain lead, as the first beer drawn off in the morning at a tap with a lead pipe has been known to do and symptoms of acute poisoning follow. There is sickness, colic, sometimes diarrhoea, but usually constipation, cramps in the legs and drowsiness. An emetic should be given, and thereafter milk freely, and ½ oz. of Epsom salts in half a glass of water. The patient should be kept warm.

On account of its extensive use in the arts and for water-pipes, etc., lead is not infrequently a cause of chronic poisoning. Painters, plumbers, pottery-glaziers, compositors and others, in addition to those employed in lead-mining and the extraction of the metal from the ore, are always subject to this risk. The poison may be inhaled as dust, but the usual thing is for food to be contaminated by poison adhering to the hands. Outside such trades the consumption of water containing lead is a common cause of poisoning. A soft water and a peaty water, on account of a certain acid it possesses, are especially dangerous. There is a gradual depreciation of the health ; the appetite fails, and there are signs of anaemia. A blue line forms on the margins of the gums. The bowels become very constipated and paroxysms of colic, often referred to as painters' colic, occur.

The pain is excruciating, and the abdomen is drawn in and feels hard. Inflammation of nerves, what is called peripheral neuritis, causes cramp-like pains in muscles and paralysis. There may be foot or wrist drop, or the hands may develop a claw-like deformity. The muscles waste, and sensation is impaired.

Legislative enactments (1920) against the employment of women and children in certain lead processes, and against the consumption of food, drink or tobacco in places where such are carried on, should do something to diminish the incidence of lead poisoning. The strictest personal cleanliness should be observed by all engaged in occupations involving the risk. One danger that should be borne in mind is cigarette smoking when the hands may be soiled with lead. The free use of sulphuric acid lemonade, or of milk is an additional way of safeguarding oneself.

Chronic lead poisoning is treated by the free use of magnesium or of sodium sulphate in order to get the bowels acting, and as an antidote against lead in the digestive tract, and then by giving a course of potassium iodide to wash the drug out of the tissues.

LEECH. Once extensively used as a means of extracting blood and relieving congestion, the leech is seldom seen nowadays, though there are some disorders in which the application of one or more of them may be valuable. The skin on which a leech is to be used should be washed clean. The creature is left on the skin until it elects to drop off. It should on no account be dragged off, but if it delays unduly, or if a leech has become attached accidentally, a strong solution of common salt may be poured on it. When the leech comes away, it is put into the fire. Should the bite continue to bleed, firm pressure will usually serve to stop this. *See* Bleeding ; Cupping.

LEG. In anatomy the leg is the part of the lower limb between the knee and the ankle, the upper part of the limb being the thigh (q.v.). The skeleton of the leg is formed of the tibia, or shinbone, on the inner, and the fibula on the outer side, the gap between the bones being filled up by a membrane.

The muscles on the front of the leg flex the ankle and extend the toes ; those on the outer side, the peronei, assist in extending the ankle, but also twist the foot outwards. The large fleshy bulk of the calf is formed of the gastrocnemius and soleus muscles which are inserted by the Achilles tendon (q.v.) into the heel bone ; these with other muscles on the back of the leg extend the foot ; others flex the toes.

The main arteries of the leg are the anterior and posterior tibial, branches of the popliteal, and the main nerves, the internal and external popliteal, branches of the great sciatic. The superficial veins on the front of the leg drain into the long or internal saphenous, which passes up on the inner side, and those on the back into the external or short saphenous vein which passes up the back of the limb and dips in behind the knee.

Varicose veins (q.v.) are rather common in the legs and may lead to eczema, ulceration and discoloration. In dropsy the legs, being dependent, are early and much affected. Great wasting of the muscles of the leg, especially those in front, may occur from infantile palsy, but may also be found in other nervous diseases. *See* Achilles Tendon ; Ankle ; Artificial Limb ; Fibula ; Foot ; Knee ; Sciatic Nerve ; Thigh ; Tibia.

LEISHMANIASIS. A genus of animal parasites, belonging to the class of protozoa, causes certain disorders which are described in a general way as leishmaniasis. Two of these disorders, oriental sore and kala-azar, are fairly widespread in the East, while the third, espundia, occurs only in South America. In the latter form, an ulcerative sore forms on a mucous membrane. Treatment is not satisfactory. *See* Kala-azar ; Oriental Sore.

LEITER'S TUBES. A flexible metal tube, used for applying continuous cold to some part of the body, is known as Leiter's ; it can be twisted into the shape of a cap or otherwise, according to the part for which it is intended. A long rubber tube attaches one end to a water-tap, while a similar tube is led from the other end into a sink to carry off the effluent (*see* Plate 17).

LEMON. Fresh lemon juice contains citric acid, and acts as a refrigerant, or cooling medicine, in fevers, in which it is usually given as home-made lemonade or as Imperial drink. The juice is rich in the antiscorbutic vitamin, and is extensively used in the prevention of scurvy; it is also capable of curing the disease. Fresh lemon juice is sometimes used in making an effervescent draught. Syrup of lemons, made from the fresh fruit, is used as a flavouring agent in mixtures.

Oil of lemon, obtained from the fresh peel, is also used as a flavouring agent. In doses of ½ to 3 minims, dropped on sugar, it will relieve colic and flatulence. The tincture of lemon, dose ½ to 1 drachm, is likewise made from the fresh peel, and has the properties of the oil. *See* Beverages; Citric Acid.

LEPROSY. An infectious disease caused by the bacillus leprae, leprosy occurs in the tropics and in certain parts of Northern Europe. Infection takes place through the skin or mucous membrane, from actual contact with leprous sores or with clothing and utensils used by lepers, or by the bites of infected insects. The incubation period varies from a few weeks to four years or longer, after which there are feverish symptoms and the appearance of reddened patches on the face and other parts of the body. Later these patches are replaced by brown, pigmented areas.

The disease may now advance in one of two ways, becoming either the nodular or the anaesthetic form. In the former, thickened elevations or nodules, of a purple or earthen colour, appear on the pigmented patches. When this occurs on the face, what is called the leonine facies is produced. Nodules may ulcerate and by the advance of this ulceration, fingers, toes, the nose, ears or eyes may be lost. In the anaesthetic form there are no nodules but infiltration of nerves. The central part of the stained patches become atrophic and shiny. There is hyperaesthesia in various parts and neuralgic pains. Ulceration is readily induced and may lead to the loss of fingers, toes, etc.

Leprosy runs a prolonged course, tuberculosis or Bright's disease being often the actual cause of death. Persons suffering from leprosy should be segregated. Children should not be allowed to remain with leprous parents. Thorough treatment with chaulmoogra oil or its preparations usually cures the disease in the early stages and is, at any rate, beneficial later on.

LEUCOCYTE. There are several varieties of white corpuscle, or leucocyte, in the blood, which can be differentiated by staining methods. By the use of an instrument, known as a haemocytometer, the number of cells, both red and white, in a cubic centimetre of blood can be counted and the number of each variety of the white. From variations in the results of such examinations it may be possible to draw important conclusions in diagnosis and prognosis. The average percentages of the varieties are as follows: polymorphonuclear, 60 to 70; large mononuclear, including the so-called transitional, 3 to 5; lymphocytes, 25 to 30; eosinophil, 1 to 4; and mast cells, 0.5. All of these are produced in bone-marrow. (*See* Plate 12.)

An increase in the white cells is called leucocytosis. This may be physiological, as after a meal, when lymphocytes abound. Or it may be pathological ; here the increase is usually in the polymorphs and is defensive. This rôle of the white cells is discussed under the heading Blood. In tuberculosis, small-pox and whooping-cough there is an increase of lymphocytes, i.e., a lymphocytosis. In infestation with worms, in asthma and some other disorders, there is an increase of eosinophils, a condition described as eosinophilia. If the number of leucocytes falls below 5,000 per cubic millimetre a state of leucopenia is said to exist. This occurs in typhoid and paratyphoid fever, and also in other diseases. *See* Blood ; Leukaemia.

LEUCORRHOEA. A discharge from the female genital passage is described as leucorrhoea. This means literally a white discharge and properly designates the discharge which is popularly known as "the whites." It has come, however, to mean any discharge, except, of course, a simple bleeding. Leucorrhoea may occur when there is no local cause or, at most, a slight one, but the general health is below par, notably in anaemia.

A discharge may be due to acute infection of the parts and consist largely of pus. Congestion of the neck of the womb, which may be associated with laceration following labour, is a common cause of leucorrhoea. In view of the variety of possible causes of a discharge, medical advice should be obtained.

A discharge may be lessened and sometimes cured by a douche (q.v.) of water containing sufficient permanganate of potassium to make the solution red, or common salt or alum, a teaspoonful of either to the pint.

In children a discharge usually comes from the external parts and is due to want of cleanliness or irritation from threadworms.

LEUKAEMIA. A disease characterised by a persistent increase of the white cells of the blood, associated with changes in the blood-forming organs, is described as leukaemia, or leucocythaemia. In one form of this disease the increase is in the lymphocytes and it is called lymphatic leukaemia ; in the other there are large numbers of immature cells in the blood such as in health are only found in the bone-marrow, and it has been known as spleno-medullary leukaemia.

Acute lymphatic leukaemia usually affects young children. It begins suddenly and generally with bleeding from the nose or mouth and into the skin. The child is fevered and rapidly becomes waxy-looking from anaemia, the gums become softened and bleed as in scurvy, and bleeding may take place from the bowels or kidneys. Death takes place in from a few days to a few weeks. Chronic lymphatic leukaemia usually affects middle-aged people. There is swelling of the glands in the neck, the armpits and the groins. The spleen and liver also enlarge. Anaemia begins and increases, with consequent weakness.

There is no useful treatment for the acute forms of leukaemia. In the chronic forms fresh air, wholesome food and rest may help to keep the patient more comfortable. Arsenic and benzol are the most useful drugs. *See* Anaemia ; Leucocyte.

LEUKOPLAKIA. White patches on the tongue and inside of the cheek, occurring usually in elderly men, are described as leukoplakia. They are caused by an overgrowth of the surface epithelium in consequence of inflammation, which can often be related to syphilis, over-smoking, a constant use of raw spirit, or a combination of these. After a time the patches become painful, and later on may become the site of cancer.

Smoking, strong spirits, acid wines, condiments, and very hot food must be avoided. A lotion containing sodium bicarbonate may be useful, and also antiseptic applications. The mouth should be kept very clean.

LICHEN. A considerable number of skin diseases are described as lichens, but this must not be taken to imply any essential connexion between them. At most it means that a disease is characterised by the existence of solid papules, or pimples, throughout its course.

In lichen planus the papule is small, polygonal, reddish to purple in colour and with a flat, glancing top. The disease is occasionally acute, with papules scattered over the body; but usually it is localised and chronic, fresh crops appearing at considerable intervals. The inside of the thighs and the front of the forearms are common sites. Arsenic and mercury are given internally, and tar and other ointments are used on the patches. The high-frequency current is sometimes valuable.

Lichen scrophulosorum occurs in tuberculous people. The papules are brown. Treatment includes that for tuberculosis. Lichen simplex is a name applied to the papular stage of eczema and other eruptions. Lichen urticatus, which occurs in children, is related to nettle-rash (q.v.).

LIENTERIC DIARRHOEA. The common desire to empty the bowels after breakfast is due to the filling of the stomach stimulating contractions in the lower bowel through a nervous mechanism. This is called the gastro-colic reflex, and takes place to some extent after any meal. If this reflex is too easily excited, the bowels may move several times after breakfast or even after each meal, a state of affairs described as lienteric diarrhoea. Some article of diet may be primarily responsible, and diarrhoea may be prevented by refraining from it. A short rest after a meal will sometimes prevent diarrhoea in those who are subject to it. Belladonna and bromides are amongst the drugs used in treatment. *See* Diarrhoea.

LIGAMENT. The bands or cords passing between the ends of the bones forming a joint, and keeping them in position, are described as ligaments. They are formed of interlacing strands of white fibrous tissue and do not stretch, though they are so arranged as to permit of the required movements at a particular joint. Other ligaments, formed of yellow elastic tissue, are able to stretch, and such are found where, as between the vertebrae, a considerable range of movement is required while the ligament remains taut and keeps the parts steady.

LIGATURE. To ligature a blood vessel, or any other part, is to constrict it by tying something round it, the cord or thread used for the purpose being described as a ligature. This may be necessary in cutting operations and in accidental bleeding, and is sometimes the method of treatment adopted for piles and warts, or other small tumours which have a slender stalk or pedicle attaching them to the body. For blood vessels a catgut ligature is usually chosen, as this becomes absorbed after some days and disappears. For piles and warts strong linen or silk thread may be used. This must be sterilised before use.

The term ligature is also used to denote a bandage applied to a limb to arrest the circulation, as a tourniquet (q.v.) in the case of a dog or a snake bite.

LIGHT. The ultra-violet rays have important functions in the processes of life, and their effect on health is far-reaching. Those coming to us from the sun, however, are largely prevented from passing through the atmosphere by dust and moisture, and the supply is therefore very restricted in towns. Moreover, they are absorbed by ordinary window glass, so that they are not available in a room so protected. Arc lamps of various kinds, including the Finsen and the Krohmayer, are used to produce ultra-violet rays artificially, so that this method of therapy is readily available. The light from such lamps is sometimes described as artificial sunlight. Different expedients are used to cool the rays.

Exposure to ultra-violet rays will kill micro-organisms, and this explains the long-known disinfecting properties of sunlight. It also largely explains the success of ultra-violet rays in the treatment of skin disorders. Tissue activity is also stimulated and endocrine (q.v.) activity. Exposure to ultra-violet rays also increases the vitamin activity of foods.

The value of ultra-violet rays, first demonstrated by Finsen in the treatment of lupus, has now been proved for a large number of other skin diseases, including boils, carbuncles, eczema, baldness, chilblains and psoriasis. In consequence of their effect on vitamin activity, the rays also afford a powerful means of preventing and curing rickets. They have, in addition, a general tonic effect on the whole body, and can restore vigour and joie-de-vivre when such qualities are deficient or lacking. Often they have a tranquillising effect in states of irritability. Applications of the rays have cured sciatica and lumbago, headaches and neuralgia, and have been beneficial in many other disorders.

Treatment by natural sunlight, or heliotherapy, is carried out at Alton and Hayling Island in connexion with the Treloar Homes, and elsewhere in Great Britain, and at Leysin in Switzerland and other places abroad. The value of light in the treatment of surgical tuberculosis was well established at some of those places a long time before its other possibilities were grasped. As ultra-violet rays form such a powerful weapon, however, their indiscriminate use, or, particularly when they are artificially produced, their overdosage, is capable of doing harm. Even moderate doses have been proved to be capable of causing quiescent tuberculosis of the lung to flare up into activity, and of doing other harm so that this form of therapy is unsafe except under medical supervision. During applications of artificial light patients and nurses should wear goggles to protect the eyes.

LIME. *See* Calcium.

LINIMENT. An external application intended to be rubbed into the skin is described as a liniment, or embrocation. Of the official liniments, those of aconite, belladonna and opium are anodyne; those of ammonia, camphor, ammoniated camphor, croton oil, mustard, soap, turpentine and the acetic liniment of turpentine cause reddening of the skin, or are stimulating; that of chloroform is both stimulating and anodyne; that of lime is sedative to an inflamed surface; and those of mercury and of potassium iodide with soap are stimulating and further the dispersal of inflammatory enlargements. The anodyne liniments are usually applied without rubbing, on a piece of lint. Much of the value of the stimulating liniments depends on the rubbing.

LINSEED. The seed of common flax, linseed is chiefly used for making a poultice (q.v.). The oil, which is expressed from the seeds without the aid of heat, is sometimes used externally as an emollient. With an equal part of lime water it made the original carron oil. The infusion, or linseed tea, may be taken in irritable states of the bladder.

LIQUORICE. Glycyrrhiza or liquorice root is a demulcent and in sufficient doses a mild purgative. Either the dry or the liquid extract, the dose of which is ½ to 1 drachm, is used to cover the taste of unpleasant drugs, such as senna, aloes, Epsom salts and ammonium chloride. The compound liquorice powder contains also senna, fennel and sulphur. It is used, in doses of 60 to 120 grains, as a laxative, especially for children and for women during pregnancy. Liquorice relieves pharyngeal irritation and is much used in cough mixtures and pastilles.

LITHAEMIA. The term lithaemia implies the accumulation in the blood of substances of the uric acid group as a consequence of faulty food or tissue metabolism. This condition is presumed to underlie and precede gouty manifestations and urinary lithiasis. Lithaemia is caused by excess in eating and drinking, particularly when combined with deficient exercise. Treatment consists in a plain, moderate diet, including fresh vegetables and fruit, and a sufficiency of exercise. Lithia salts are beneficial and a liberal consumption of water. *See* Kidney; Uric Acid.

LITHIUM. Salts of lithium, which is a metal in the same class with sodium and potassium, are used for their diuretic and antacid effects. In lithiasis or gout the administration of lithium gets rid of much uric acid from the system. Carbonate of lithium, dose 2 to 5 grains, and citrate of lithium, dose 5 to 10 grains, are the salts most in use. An agreeable way of giving the latter is as the effervescing citrate of lithium.

LIVER. The largest gland in the body, weighing about 53 ounces in the adult male, the liver is situated in the upper part of the abdomen on the right side. The thick part, or right lobe, as it is called, is tucked up into the right dome of the midriff, or diaphragm, and lies behind the ribs ; but towards the middle line, where it is now the left lobe, the liver passes out from the protection of the ribs.

A large vein, the portal, brings blood to the liver from the stomach and bowel, the pancreas and the spleen ; and, contrary to the usual behaviour of veins, this vein breaks up into smaller veins, and these into a large capillary network which traverses the substance of the liver. Blood is also brought to the liver by the hepatic artery. Nerves of various kinds enter the organ. A duct of considerable size, the hepatic duct, drains bile from the liver ; this duct is joined by the cystic duct coming from the gall bladder, and then becomes the common bile duct through which bile is emptied into the duodenum.

The liver is made up of an immense number of lobules, circular or oval in shape, and consisting of rows of liver cells radiating from a centre which is occupied by the central or intralobular vein. Between the rows of cells are two sets of capillaries for blood and for bile, which communicate with larger vessels at the margins of the lobules. Surrounding and permeating the lobules is a delicate fibrous tissue.

Blood flows from the periphery to the centre of a lobule, the hepatic cells meanwhile extracting from it substances for storage or excretion, and by the intralobular vein is conveyed to larger veins, through which it passes to the hepatic veins and is discharged into the inferior vena cava, and so reaches the heart.

Liver cells have many activities. They produce bile, the materials for which they extract from the blood. Bilirubin, the colouring matter occurring most abundantly in human bile, is formed by other cells which are found in the lining of the liver-capillaries and elsewhere. It is derived from the haemoglobin of the blood. Liver cells also extract harmful substances from the blood, either converting them into harmless ones or excreting them in the bile. If, however, such substances are in excess in the blood, as when the digestion is disordered, they may not be dealt with adequately in the liver, so that a proportion passes on into the blood circulating throughout the body, producing symptoms of " biliousness." Urea is formed in the liver, and is passed into the blood to be excreted by the kidneys. The liver produces fibrinogen, the substance in the blood that forms a clot, and antithrombin, a ferment that prevents clotting in the circulating blood. Another important function of the liver cells is to take up sugar from the blood and store it as glycogen, subsequently reconverting this into sugar to meet the demands of the body. Sugar is the fuel which supplies muscles with energy.

DISEASES OF THE LIVER. Diseases of the liver may or may not be accompanied by jaundice (q.v.). Some diseases cause enlargement of the liver ; others diminish its size. Enlargement may be due to a large number of causes, including the following : (1) Hypertrophy, or a simple overgrowth of the organ. (2) Fatty infiltration ; this is usual in the obese, and may occur in chronic alcoholism. (3) Acute inflammation of the liver, or hepatitis ; here there is acute congestion. The cause may be the poison of a fever, alcohol, etc. (4) Chronic congestion, which may accompany indigestion ; the so-called tropical liver is of this description. (5) Passive congestion, or nutmeg liver ; an over-filling of the vesicles and capillaries due to an inefficient flow in the inferior vena cava, such as occurs in advanced heart or lung disease. (6) Abscess, which may be due to septic infection or pyaemia, or to the amoebic parasite of dysentery. In the former event the abscesses are likely to be small and multiple, but not causing great enlargement ; a tropical, or amoebic abscess is generally single, and there may be great enlargement. Here there is likely to be a history of previous dysentery, and the symptoms pointing to the liver are preceded and accompanied by a hectic type of fever (q.v.) which may suggest malaria. Unless evacuated by operation, the abscess may rupture into the abdominal cavity or through the diaphragm and into the lung. Besides evacuating the abscess, emetine is injected subcutaneously.

(7) Obstruction of the bile ducts may cause slight enlargement, accompanied by jaundice. (8) Cirrhosis. In ordinary cirrhosis, the so-called gin-drinker's or hob-nailed liver, the organ is atrophied, but in some forms of cirrhosis, for example, Hanot's, there is enlargement. This occurs in young people mainly. (9) Splenic anaemia. In this disease the spleen is enlarged, and later the liver, from cirrhotic changes. At this stage the disorder is commonly known as Banti's disease. An accumulation of fluid in the abdominal cavity, or ascites, is a usual accompaniment. (10) Syphilis. From cirrhotic changes or numerous gummata the liver may be enlarged more or less. (11) Amyloid disease. Here degenerative changes cause the replacement of the cells by a translucent waxy-looking substance. Syphilis, or long-standing suppuration somewhere, are the common causes. (12) Hydatid disease (q.v.). Irregular enlargement may occur from the formation of cysts in association with the presence of the hydatid worm. (13) Cancer. Malignant disease of the liver is generally secondary to the disease elsewhere, say, in the bowel. There may or may not be jaundice, but there is progressive and great wasting with cachexia.

Diminution of the liver in alcoholic cirrhosis is accompanied by the development of knobs on its surface. There may be no symptoms for a long time, but at last the contracted fibrous tissue in the organ obstructs the venous circulation, so that there is congestion of the lining of the stomach and bowel with consequent indigestion, and perhaps vomiting of blood and its passage by the bowel. For the same reason ascites is also common. The treatment is mainly symptomatic.

Fatty degeneration of the liver occurs in poisoning by phosphorus and other substances, and in certain diseases, including acute yellow atrophy. This is a rapidly fatal disorder, the cause of which is not clear. *See* Bile; Biliousness; Indigestion.

LOCKJAW. Tetanus is popularly known as lockjaw because this symptom occurs early in the disease. The cause of the disease is infection with the tetanus bacillus, an organism which is commonly seen with a rounded knob at one end and so is called the drum-stick bacillus. The knob represents a spore, from which a fresh organism will develop; these spores are very resistant to heat, cold, drying and ordinary antiseptics. The tetanus bacillus is a normal inhabitant of the intestine of horses and cattle and is present in manured soil. Contamination of a wound with such soil at once creates a risk of tetanus.

The microbes themselves do not travel far from the site of introduction, but their poisons pass up motor nerves to centres in the spinal cord and brain. Symptoms may begin from a few hours to some weeks after infection. There may be such disturbances as sleeplessness, frequent yawning, stiffness in the throat muscles and difficulty in swallowing. Then the lower jaw becomes spasmodically fixed (trismus) and soon the spasm involves the rest of the face, the neck, the trunk and the limbs. The patient appears to grin or snarl, the so-called risus sardonicus, the head is drawn back, the neck is fixed and painful and the trunk and limbs are fixed. The back may be bent backwards or forwards or to either side. The spasms relax from time to time but rarely completely and are readily brought on by noise, a bright light, or a breath of wind; they are very painful.

The duration of the disease varies from a day or two onwards, and the longer it lasts beyond ten days the better the prospects. Even more important from the point of view of prognosis is the duration of the incubation period; the odds in favour of recovery are considerably increased if this lasts beyond ten days and again increased if it lasts beyond three weeks.

Any wound should be cleaned up as a matter of course, but if there is any possibility of contamination with tetanus, as when the wound is got during gardening or on the football field, for example, a prophylactic injection of antitoxic serum should be given as soon as possible. The disease is treated by keeping the patient perfectly quiet in a darkened room. Injections of serum are given. *See* Antiseptic; Serum Therapy.

LOCOMOTOR ATAXIA. Also known as tabes dorsalis, locomotor ataxia is a chronic disease of the spinal cord. The morbid changes are brought about by syphilis but do not occur until some years after infection with this disease, not until middle life as a rule. Locomotor ataxia is more common in men than in women and in city, rather than country, dwellers.

Usually the first thing to be noted is loss of the knee jerk (q.v.) on one or both sides. It may be noted also that although the pupils contract on looking at a near object, they do not do so on exposure to light, a state of affairs described as the Argyll-Robertson pupil. Severe pains, known as lightning pains, may shoot down the legs and there may be a little difficulty in passing water. Sometimes vision becomes progressively impaired owing to atrophy of the optic nerve. After some time, possibly many years, the patient finds that he is unsteady in walking if he cannot keep his eyes on his feet, or he manifests Romberg's symptom, that is inability to stand steady with the feet together and the eyes shut. He usually develops a gait (q.v.) that is typical of ataxia.

Ordinary tactile sensation is impaired and also the sense of pain. Sometimes there is a sensation of a tight cord round the waist—the so-called girdle sensation. Another kind of disturbance is what is called a visceral crisis. The most common is the gastric crisis in which pain, sickness and vomiting occur and suggest something seriously wrong in the stomach or bowel. There is also a laryngeal crisis, consisting of a persistent tickling cough ; or it may be dyspnoea.

Trophic disturbances are represented by perforating ulcer of the foot, and also by Charcot's joint, a condition characterised by rapid swelling from excessive effusion into the joint, with subsequent disintegration. Owing to the difficulty in emptying the bladder inflammation of this viscus or cystitis, is apt to ensue. Finally the patient becomes helpless and bedridden. If similar morbid changes have affected the brain he will have shown the mental symptoms of general paralysis of the insane (q.v.).

The incidence of this disease would be greatly lessened by thorough treatment of all cases of syphilis, and anti-syphilitic measures form an important part of the treatment. In addition to this, treatment may be required for different symptoms. Re-education in walking should be undertaken. *See* Ataxia ; Equilibrium ; General Paralysis of the Insane ; Syphilis.

LORDOSIS. *See* Spinal Curvature.

LOTION. A liquid preparation for external application, a lotion may be used to bathe a part, the best thing to use for the purpose being a small piece, usually referred to as a pledget, of cotton-wool or gauze. This is soaked in the lotion and squeezed out over the part ; sometimes it is used like a sponge to wipe a part clean. For other purposes a piece of lint or gauze is soaked in the lotion, squeezed partly dry and applied. For an evaporating lotion a single layer of gauze is applied and is kept constantly moist by dropping on more lotion from time to time.

Lotions are sometimes classified according to their uses, as antiseptic, astringent or sedative, but a lotion may have more than one action.

An evaporating lotion is used for cooling some parts of the body. A tablespoonful of dilute acetic acid or vinegar in half a pint of water, or one part of eau-de-Cologne to two parts of water, will make a satisfactory lotion for these purposes. An eye lotion is often called a collyrium (q.v.). *See* Boracic Acid ; Lead.

LOUSE. There are three types of louse, or pediculus, that may infest the human body, namely, the head louse, the body louse, and the pubic louse, usually known as the crab louse. The presence of lice causes itching, sometimes intense, and the scratching that ensues tends to cause excoriations which may become infected with pus-producing microbes. Patches of eczema may also form and in a prolonged infestation with body lice the skin may become pigmented from the scratching. A person who harbours lice or has a skin affection caused by them is said to suffer from pediculosis.

Lice are carriers of typhus fever, relapsing fever, trench fever, and possibly other diseases, but although the insects are blood-feeders, infection is not usually caused by the bites but by inoculation, through a person scratching the excreta of the insect into the skin.

The head louse runs freely over the scalp, but the body louse usually haunts the seams of underclothing except when it moves over the skin to feed. The crab louse remains firmly attached to a pubic hair and close to the skin. This creature has a somewhat shield-shaped body and claw-like legs, which distinguish it from the other types. These have oval bodies and resemble one another except that the body louse is rather larger. The eggs of lice, nits, are tiny, pear-shaped objects and are glued to the hair.

Lice may be got from personal contact with an infected person, from a bed in which he has slept or from his clothing ; occasionally such agents as wind, flies and domestic animals may be responsible. Crab lice might possibly be got from a privy-seat. A full bath and change of underclothing, at least weekly, will usually protect from the invasion of lice. The head of a child at school should be regularly inspected, however.

To clear off lice from any part of the body it is necessary to deal with the nits as well as the adult insects. The attachment of nits to hair can be loosened by thoroughly damping the hair with a lotion consisting of equal parts of vinegar and water. The nits can then be removed by means of a small-toothed comb.

Ordinary paraffin oil is an efficient remedy for application to the head, but its inflammability must always be borne in mind. The oil is rubbed into the head, a rag soaked in the oil is then put over the scalp and then a bathing cap. This is left on for ten to twelve hours and the process is twice repeated, after which the head is thoroughly washed with soap and water. If there is much eczema equal parts of olive oil and paraffin should be put on, but the application must be repeated on each of twelve days, after which the head is washed.

For body lice the body may be thoroughly rubbed over with a mixture of 5 oz. of petroleum insecticide and 2 drachms of eucalyptus oil, after which a hot bath is taken ; or sulphur or stavesacre ointment may be applied for two or three days and then a bath taken. For the crab louse white precipitate ointment should be used freely on the affected parts.

Clothing should be baked in an oven at a temperature of 160° to 175° F. This may be done by having a good fire, placing the clothing, wrapped in paper, in the oven, and allowing the fire to die down ; or the clothing may be soaked in a solution of lysol of a strength of a teaspoonful to the pint of water.

LUMBAGO. Pain in the back, due to fibrositis (q.v.) in connexion with the muscles of the loins, is called lumbago.

LUMBAR REGION. Corresponding to what is usually described as the small of the back, the lumbar region is built up on the five lumbar vertebrae, this bony column being strengthened behind by the powerful erector spinae muscle, and in front by the psoas muscle. The organs lying in front of the lumbar region are the kidneys and the ascending and descending colon.

Lumbar puncture is the name given to the operation of passing a hollow needle between two vertebrae into the spinal canal and through the arachnoid membrane of the spinal cord. This is done, for example, to obtain a sample of the cerebro-spinal fluid. *See* Back ; Backbone.

LUNAR CAUSTIC. The nitrate of silver is familiarly known as lunar caustic. *See* Silver.

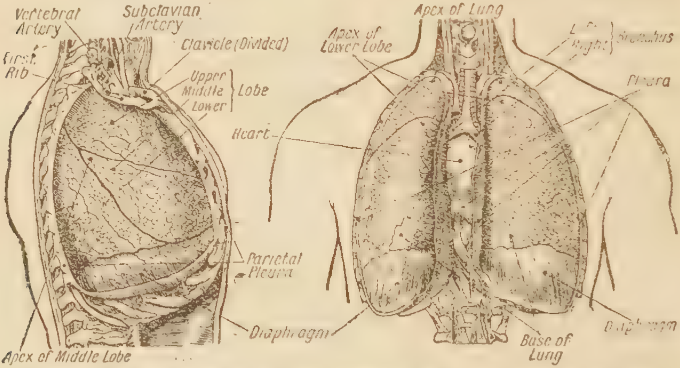
LUNG. The lungs lie in either side of the chest. The space in the middle of this cavity, the mediastinum, is mainly occupied by the heart and great blood vessels, the gullet and other structures, but otherwise the chest is packed with lung. The general structure of a lung resembles somewhat that of a tree. The stem is represented by a main bronchus (*see* diagram in page 470) passing to the lung, and this bronchus subdivides into small air-tubes and so on by ramifications, until minute tubes, or bronchioles, are reached. Each of these opens into an expansion, the walls of which are studded with the air-cells or alveoli.

The larger bronchial tubes contain rings of cartilage, but as they become smaller these tubes have fewer rings. In the smaller tubes, however, there is more muscle, arranged round the tube ; it is the contraction of this and consequent narrowing of the tubes that account for the symptoms of asthma. The air-cells are crowded together, but in the space between adjoining cells is a great network of blood capillaries, and through the very thin walls of the cells an interchange of gases can take place between the blood in the capillaries and the air in the cells, oxygen passing into the blood and carbonic acid in the opposite direction.

Blood is supplied to the capillaries by the pulmonary artery and carried off by the pulmonary veins. Lymphatic vessels also course through the lungs and nerve fibres are supplied by the vagus and the sympathetic nerves. The assemblage of vessels and the bronchus and other structures entering or leaving the organ forms the root of the lung. Here are also lymphatic glands into which are drained the lymphatic vessels coming from the lung. Surrounding the root is a smooth membrane, the pleura (q.v.), which also covers the lung, and at the root is reflected on to the inside of the chest wall.

A lung is somewhat conical in shape, the uppermost part forming the apex and the broad lower portion the base. The right lung has two deep clefts in it, dividing it into three lobes, but the left lung has only two lobes. The apex projects 1½ to 2 in. above the collar-bone into the root of the neck, and is a usual site of the beginning of pulmonary tuberculosis.

Because of its air-content, percussion over a normal lung produces a resonant sound. On listening over a lung a respiratory murmur is heard both in inspiration and expiration, the latter sound, however, being considerably the shorter.


Vertebral Artery
Subclavian Artery
First Rib
Clavicle (Divided)
Upper
Middle
Lower
Lobe
Apex of Middle Lobe
Parietal Pleura
Diaphragm
Apex of Lung
Apex of Lower Lobe
Heart
Left
Right
Bronchus
Pleura
Diaphragm
Base of Lung

LUNG. Sectional views of the chest showing (left) three lobes of the right lung and (right) both lungs seen from the back, with the heart between them

Diseases of the Lungs. Acute congestion of the lungs accompanies pneumonia and other inflammatory diseases of the lungs or tubes. Passive congestion is common in disease of the heart when the return of the blood from the lungs is obstructed. In old, bedridden people the bases of the lungs tend to become over-loaded with blood, through feebleness of the circulation there. To prevent this the position of the patient should be altered frequently. Oedema of the lung accompanies inflammatory and congestive states. Sometimes, as in Bright's disease, it may come on suddenly; the patient is extremely breathless and coughs up large quantities of frothy sputum.

Bleeding from the lung occurs in pulmonary tuberculosis, pneumonia, infarction and other disorders. An abscess in the lung may occur in pneumonia, in pulmonary tuberculosis, or from embolism (q.v.) with an infective plug. In severe infections of the lung or of the tubes, as in bronchiectasis, or when the blood supply is interfered with by plugging of the pulmonary artery, death, or gangrene, of a portion of lung may take place. Emphysema (q.v.) is the name given to the dilatation of the air cells.

In pulmonary tuberculosis, or after pneumonia, or in collapse of the lung from the pressure of fluid on the pleural cavity, in dust disease and from other causes, a chronic inflammatory process may result in the formation of much fibrous tissue in the lung with a corresponding amount of consolidation of its tissue. This condition is described as fibrosis. *See* Asthma ; Breathing Exercises ; Bronchi ; Bronchiectasis ; Bronchitis ; Bronchopneumonia ; Consumption ; Emphysema ; Pleurisy ; Pneumonia ; Râle ; Respiration.

LUPUS. The skin disease known as lupus vulgaris, but often referred to simply as lupus, is caused by the tubercle bacillus. As a rule it begins in childhood. The germs gain entrance through a little abrasion of the skin or a mucous membrane, commonly that lining the nose. The first appearance of the disease on the skin is as a little brown nodule. This is situated in the true skin, but is visible through the epidermis. Groups of such nodules form a lupus patch, and while nodules may sometimes degenerate and be replaced by scar tissue, others break through the surface of the skin, and the exposed unhealthy tissue is then invaded by ordinary pus-forming microbes, which cause discharge or pustules, and these, by drying up, form crusts and scabs. The surface itself becomes an ulcer, and spreads more or less. Scarring takes place over part of the surface.

It is all-important that lupus should be recognized and treated in its earliest stages. The general health is usually fairly good, but the point must be considered and, when necessary, improved hygienic conditions, a generous diet, cod-liver oil and tonics should be resorted to. The diseased patch should be cut out and the wound repaired by stitching, or skin grafting when such treatment is feasible. Other operative treatment includes scraping, scarification, cauterisation and the use of carbonic acid snow. Very good results are achieved by Finsen light treatment. Other lamps, which produce ultra-violet rays, are being used and also diathermy. Encouraging results have been got by ionisation. Some doctors use radium. *See* Light ; Tuberculosis.

LYMPHATIC SYSTEM. Besides the circulation of the blood, there is another circulation going on throughout the body, namely, the circulation of lymph. This fluid, which in composition resembles a diluted blood plasma, transudes from the blood capillaries and fills the spaces between body cells. From these spaces part returns to the veins, but part is taken up by tiny lymphatic capillaries which open on the spaces and is conveyed to larger lymphatic vessels. These, like veins, possess valves, so that lymph can only flow in one direction.

Interposed in the course of the lymphatic vessels are structures, varying in size from that of a pinhead to a bean, known as lymphatic nodes or glands. These contain spaces through which the lymph percolates, but also masses of cells resembling the lymphocytes in the blood ; in fact, such cells in the blood may be produced to some extent in lymphatic glands. The glands to a large extent clear the lymph of bacteria and other noxious substances, and so prevent their reaching the blood stream.

Glands occur in groups of two to fifteen, and are embedded in connective tissue. There is a superficial set and a deep set. All the lymphatic vessels of the body drain into two main vessels, known as the thoracic duct and the right lymphatic duct. The former begins near the right kidney as the receptaculum, or cisterna chyli, and passes up through the diaphragm and chest cavity to the root of the neck, where it opens into the angle of junction of the left subclavian and internal jugular veins. The right lymphatic duct opens into the junction of the right subclavian and internal jugular veins. It drains the right side of the chest, the right upper limb, and the right side of the head, all the rest of the body draining into the thoracic duct.

The circulation of the lymph is not helped by the pumping of the heart, but only by the movements of muscles, the existence of valves in the vessels and the suction action of breathing in the same way as the inflow from the veins is helped.

Diseases of the Lymphatic System. Inflammation of a lymphatic vessel, or lymphangitis, may be acute or chronic. The acute form may be seen often when a finger is septic, it being possible to trace the course of the inflamed vessels by the thin red lines passing up the forearm. Inflammation of the glands is called lymphadenitis, and may also be acute or chronic. When it occurs, it is necessary to scrutinise the area which drains into the inflamed glands. Thus, inflammation of glands in the groin may be due to a septic sore on a toe or anywhere on the limb above. Chronic lymphadenitis is often due to tuberculosis.

A tumour consisting of an overgrowth of lymphatic vessels sometimes forms, and is called a lymphangioma. Cysts also may be formed by the dilatation of lymphatic vessels. A tumour of the lymphatic glands may be simple and known as lymphoma, or maligant, consisting of a lympho-sarcoma. Glands may also become enlarged from the growth within them of malignant tumour-cells brought from a distance through the lymphatic vessels. *See* Elephantiasis ; Hodgkin's Disease ; Inflammation ; Leukaemia ; Thoracic Duct ; White Leg.

LYSOL. One of the cresol group of antiseptics, lysol is a dark brown oily liquid with a tarry smell. It is more powerful than carbolic acid, and less poisonous. It is generally used in the strength of a teaspoonful to a pint. *See* Cresol.

MADURA FOOT. *See* Fungus Foot.

MAGNESIUM. A whitish, silvery-looking metal, magnesium belongs to the group of alkaline earths. Several of the compounds of the metal are of importance in medicine. Magnesium sulphate, commonly called Epsom salt (q.v.) is much used as a purgative, and magnesium oxide, or magnesia, and magnesium carbonate are likewise popular remedies of this class and possess, moreover, an antacid quality. Both the oxides and the carbonates are given in doses of 30 to 60 grains, or 15 to 30 grains if the dose is to be repeated. Fluid magnesia, which is a solution of the bicarbonate, is given in doses of 1 to 2 oz., or ½ drachm for a child a year old. The so-called white mixture, or mistura alba, consists of 30 grains of magnesium carbonate and 15 grains of magnesium sulphate dissolved in an ounce of peppermint water. It is a popular laxative. Milk of magnesia and magnesia cream are pleasant preparations of magnesia.

The solution of magnesium citrate, a sort of magnesium lemonade, can be taken freely, and the effervescent citrate of magnesia is a similar preparation. The oxide, the carbonate and the citrate are useful remedies for lithaemia (q.v.). Magnesium hydroxide, in repeated doses of 60 grains, is a useful antidote for arsenic. Magnesium lactate is sometimes given to increase the coagulability of the blood.

MALARIA. The fevers described as malaria, ague, marsh fever, jungle fever and by other names, are caused by the invasion of the blood by species of a minute animal parasite belonging to the class of protozoa. The parasites are picked up from the blood of an infected individual by a mosquito (q.v.) of the genus anopheles (q.v.), and after a process of development in the body of the insect are injected into the body of another individual. Here they undergo further development. Three species of the malarial parasite are found in human beings, namely, plasmodium vivax, plasmodium malariae and plasmodium falciparum. The cycle of development in the blood of the first takes 48 hours and of the second 72 hours, so that bouts of fever occur every third and every fourth day respectively ; these fevers are therefore described as benign tertian, and quartan, fever. The development of plasmodium falciparum is more irregular, and the fever produced is called malignant tertian or sub-tertian fever.

In a typical attack of malaria there are three more or less clearly defined stages, namely, the cold, the hot and the sweating stage. At the outset the patient feels chilly and may shiver violently with his teeth chattering. This may last from ten to thirty minutes, and then he feels hot. There is headache commonly and perhaps sickness and vomiting. This stage, in which the temperature reaches its maximum, perhaps to 104° or 105° F., may last for four or five hours, after which free perspiration breaks out and the temperature falls rapidly. The spleen is enlarged in malaria and there may be tenderness over it. In the remittent type symptoms may be severe. The patient may be delirious or stuporose, and coma may supervene.

Preventive treatment, in so far as it is concerned with protection from mosquitoes by nets and otherwise, is considered under the heading Mosquito. As some time elapses between infection and the onset of symptoms, eleven days, on the average, for benign tertian, fourteen for quartan and six for malignant tertian, additional protection is afforded by taking quinine regularly, 5 to 10 grains daily or 20 grains twice a week, 10 grains in the morning and 10 at night. A pregnant woman should take smaller doses, but more frequently. The diagnosis of the existence and variety of malaria is most exactly made by a microscopic examination of the blood. Quinine sulphate, 30 grains daily, should be given, while there is fever and for three days afterwards, and then 10 grains daily for three months.

It is important that the bowels should act well, and it is desirable to give calomel, 1 to 3 grains, at the outset, and a saline each morning. As regards dietetic and general treatment, it should be that laid down for the state of fever (q.v.). During the cold stage, hot-water bottles, hot drinks, and additional blankets will be required, and when the sweating stage has ceased the patient should be sponged with warm water, put on dry pyjamas and have fresh bedding. *See* Anopheles; Blackwater Fever; Diaphoretic; Fever; Mosquito; Quinine; Tropical Hygiene; Warburg's Tincture.

MALIGNANT. As applied to a tumour, malignant means that it partakes of the nature of cancer; as applied to an infection, that its virulence is overwhelming.

MALT. Barley which has been allowed to germinate and sprout, and is then heated over a kiln, so stopping the germination, is known as malt. It contains a ferment, diastase, which converts starch into maltose, or malt-sugar, and malt itself has a sweet taste from the conversion of some of the starch in the grain. Ground malt is added to flour in making malt-bread, and to flour, other cereals or milk in making foods for children and invalids.

Extract of malt is produced by making an infusion of ground malt, filtering and evaporating down to a syrupy consistency. Apart from its diastatic power malt extract has a considerable food value on account of its maltose. It is given, in doses of a teaspoonful to a tablespoonful, to those suffering from debilitating and wasting diseases, but to get the full effect on the starch in the food it should be taken before a meal. Malt extract is often mixed with cod-liver oil.

MALTA FEVER. Around the Mediterranean and in other warm countries occurs a febrile disease which is best known as Malta fever, but is also called Mediterranean fever and undulant fever. The disease is caused by a germ known as the micrococcus melitensis, and it was established at Malta that this is introduced into the body in goat's milk. Boiling the milk destroys the infection.

The incubation period is usually about a fortnight, and fever, when it begins, does not, as a rule, reach its maximum until about the seventh day, the temperature being a little higher each night until then. During the fever headache is severe, and there may be neuralgic pains, especially sciatica. Sickness may be troublesome. At night there is commonly copious sweating. Treatment is that for fever (q.v.) generally, with measures to relieve troublesome symptoms. A vaccine may be serviceable.

MANGANESE. A metallic element with properties resembling those of iron, manganese, in the form of the prepared oxide of manganese, is used in the treatment of anaemia and amenorrhoea, the dose being 3 to 10 grains. The metal is used much more extensively, however, as a permanganate, especially that of potassium. This occurs as purple crystals, which dissolve readily in water, giving a pink to a dark purple solution, according to the amount used. The drug is a powerful oxidising agent, and so acts as a disinfectant, antiseptic and deodorant.

The dose of the crystals is 1 to 3 grains in a kaolin pill or a capsule, being given as an intestinal antiseptic in cholera, infective diarrhoea and dysentery. Solutions of permanganate of potassium are used for douching, especially when there is foetor, as in ozoena or septic sore throat, and as injections in gonorrhoea. Wounds may be washed with a solution. The official solution of potassium permanganate has a strength of 1 per cent, and dilutions for various purposes can be made by mixing with warm water; thus, a tablespoonful of the solution in half a pint would give a strength of 1 in 2,000. *See* Antiseptic; Douche.

MARTIN'S BANDAGE. *See* Elastic Bandage.

MASSAGE. Skilfully used, massage may be very beneficial in a large variety of disorders and injuries, the different manipulations being employed according to the purpose in view (*see* Plate 40-1). Effleurage is stroking with the palmar surface of the hand, fingers and palm, in the direction of the venous blood flow; if sufficiently firm, it aids the circulation of blood and lymph, improving the nutrition of the tissues. A similar movement in the opposite direction is referred to as stroking; it should be very light, and is said to have a sedative effect, and to relieve insomnia, when done over the body and limbs.

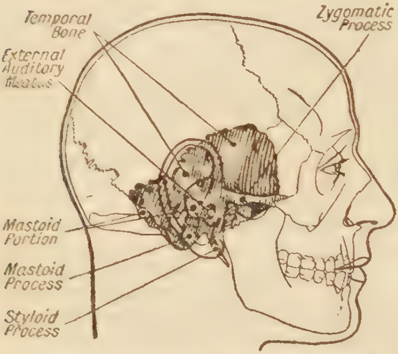
Tapotement is a tapping movement with the pads of the inner three fingers in turn, each hand being used alternately, and striking with the inner edge of the hand is called hacking. These movements, the former of which are done from the wrist and the latter from the elbow, are stimulating to the tissues. Pétrissage is the name applied to rolling and kneading movements, which are done mainly on muscles and without an emollient unless the skin is very hairy. Pétrissage stimulates the nutrition of a muscle, and may prevent wasting or improve its development, having the same effects, in fact, as light exercise, for which it may be substituted when a patient is confined to bed.

Clapping means striking the surface of the body with the hands hollowed or cupped. It has a stimulating effect on the skin, reddening it and increasing the activity of its glands. Beating and pounding are strong movements designed to reach the deeper tissues. Vibration is performed by placing the hand flat on the surface of the body and inducing a trembling movement in the hand, which is communicated to the tissues.

MASTITIS. Inflammation of the breast (q.v.) is called mastitis.

MASTOID. The blunt, bony projection behind and below the ear, known as the mastoid process, is part of the temporal bone. It gives attachment to the upper end of the sterno-mastoid muscle and the occipital artery runs backward beneath it

Disease of the Mastoid. One of the risks of suppuration in the middle ear is the extension of infection to the cavities —the antrum and cells—that exist within the mastoid process of bone, setting up what is usually referred to as mastoid disease. An acute condition may be caused by the discharge from the ear becoming blocked, by an injury or by reason of some other cause. There is generally then severe pain at the back of the ear, shooting over the head and down the neck, and generally also a very profuse discharge from the ear. There may not be much swelling behind the ear, but should the matter make its way through the bone there is likely to be considerable swelling and redness in this situation, and the skin will be dropsical. The pus may burrow down the neck. The escape of matter through the bone causes inflammation of the periosteum covering it. The periostitis may disappear with rest and the application of heat, but often it becomes necessary to make an opening and give vent to pus. This will always be required where there is pus in the mastoid, and it will be necessary then to perforate the bone also and allow free drainage of the pus.



MASTOID. The bony region behind the ear

Disease in the mastoid may lead to necrosis of pieces of bone, and there may also be destruction of the small bones in the middle ear and of portions of the bony capsule of the inner ear, with more or less impairment of hearing. In both acute and chronic mastoid disease there is also a danger of the disease extending within the skull. It is necessary, therefore, that the mastoid process should be opened up and all diseased bone taken away as far as possible. *See* Ear.

MASTURBATION. The practice of self-abuse, or masturbation, may begin in early childhood through irritation of the external genital organs. In boys the usual cause of such irritation is a tight foreskin, or phimosis (q.v.) ; in girls, the presence of threadworms or the decomposition of discharges owing to lack of cleanliness. These are things that should be attended to, apart from any question of self-abuse. Children should be warned against the practice as part of their instruction in sexual hygiene by parents or teachers. Vigorous open-air exercise and an ambition to excel in games should be encouraged.

The practice is generally discontinued as a person grows older, and, contrary to the pernicious teaching of quacks, no evil effects are to be apprehended. Where mental exhaustion or actual derangement occurs it is not from the practice itself, but rather from brooding on moral guilt and possible mental and physical penalties. The advice of a doctor should be sought by anyone unable to extricate himself from the toils of the habit.

MEASLES. A highly infectious fever, measles, morbilli or rubeola, is caused by a germ that has not yet been identified. The disease mostly affects children between the ages of six months and two years. Epidemics appear to occur about every two years, and in England reach a maximum in June and December.

The secretion of the eyes, nose, mouth and throat of a person suffering from measles contains the germs, which are therefore disseminated by breathing, and especially by coughing and sneezing. Should they reach the eyes, mouth or air-passages of a vulnerable person, there is a period of incubation of from seven to fourteen days, usually about ten, and then symptoms resembling those of a common cold occur. The temperature may be 101° or 102° F.; sometimes it is higher.

About two days later, small spots, with a white centre and a pink margin, and known as Koplik's spots, may be seen on the inside of the lips and cheeks, and reddish patches on the palate. On the second day also it is common for the temperature to drop. From three to four days after the onset the rash appears. This consists of tiny flat, dusky red or perhaps pink papules, which are grouped together to form patches, often of a crescentic shape. These appear first on the face and then on the neck and trunk, and may be very itchy. With their appearance the temperature again rises. The rash usually begins to disappear in two days, and there may be a fine scaling, or desquamation. The temperature now falls rapidly. Often enough, however, some complication occurs. Severe bronchitis is a common one, and it may go on to broncho-pneumonia. Increased rapidity in breathing, duskiness of the face, and a sharp pain in the side are some of the symptoms suggestive of chest complications.

The cough may become croupy and the breathing stridulous, showing that there is laryngitis. It must be borne in mind when such symptoms occur that they may be actually due to diphtheria, as this disease sometimes exists along with measles. Earache may indicate an extension of catarrh to the middle ear.

A person suffering from measles should be isolated at once. The treatment is that of fever (q.v.) generally, while complications should be dealt with according to the instructions given under appropriate headings. The room should be kept at a temperature of about 65° F. and the air should be kept moist by means of a bronchitis kettle. At the same time a plentiful supply of fresh air by the window is also necessary. A screen should be placed so as to prevent light falling directly on the eyes. If there is much discharge from the eyes, they should be bathed frequently with warm boracic acid solution. The mouth must be kept clean, and to ensure this it should be washed out several times daily with water containing a little glycerin of borax.

A patient should not be allowed out of bed until the temperature has been normal for a week, and the greatest pains must be taken to ensure a good convalescence by means of fresh air, good food and, when required, tonics. There is always a risk that tuberculosis of the lungs may be a legacy from an attack of measles. The patient should not be allowed to mix with others until at least two weeks after the disappearance of the rash, and only then if quite better.

Children who have been in contact with a person who has developed the symptoms of measles should not be allowed to return to school for sixteen days after the last exposure to infection. Meanwhile a close watch should be kept on them. Even before the catarrhal symptoms of measles actually appear, it may be found that a child taking measles displays a reddening of the lining of the eyelids, and has a rise of temperature at night.

Blood serum from a person convalescing from measles, if injected into another person, will generally prevent the occurrence of the disease, and this procedure is sometimes practised on young children for whom the disease carries special risks. One attack of measles generally confers immunity for life. *See* Cancrum Oris; German Measles; Infectious Disease; Rash.

MEDIAN NERVE. The median nerve runs down the arm on the inner side of the biceps muscle in company with the brachial artery, but it gives no branches to the arm. From the elbow it runs down the middle of the front of the forearm, supplying branches to most of the muscles that flex the wrist and fingers. It breaks up into branches in the hand. The median nerve is near the surface at the wrist, and can be injured by a cut on the front of the wrist. *See* Musculo-spiral Nerve; Ulnar Nerve.

MEDICINE. The household stock of drugs and dressings should be kept clean and dry in a cupboard, drawer or box placed at some distance from a fireplace or other heating apparatus. Liquid poisons and liquids intended for external use should be in bottles readily distinguishable by shape and preferably coloured. All poisons should be kept locked up, but other drugs, and dressings, should be easily got at when required.

The medicine being given to a sick person should be kept where it cannot be tampered with and should be out of the patient's reach. Before pouring out a dose of medicine the label on the bottle should be scrutinised. This ensures that the right bottle is being used and that the correct dose is borne in mind. The dose should be measured with a proper graduated measuring glass, and not by means of a spoon.

The bottle should be thoroughly shaken before pouring out the dose. The cork of the bottle is removed by grasping it between the little finger and the palm of the left hand, the measuring glass being held by the thumb and the other three fingers. When pouring out the medicine the bottle should be held so that the label is uppermost, otherwise some of the medicine might run down on to the label and not only soil it but possibly obscure the instructions. The bottle is corked as soon as the medicine is poured out.

Usually it is stated on the label that the medicine is to be taken in a little water, but, if not, water should be added nevertheless, and definite instructions obtained from the doctor at the earliest opportunity.

Some powders can be administered by placing them on the tongue and washing over with a draught of water, but others, such as light magnesia or Gregory's mixture, have to be thoroughly mixed in water before giving them. Nauseous powders should not be mixed with milk when a patient is on milk diet. Powders may be given to children mixed well in jam or marmalade. Powders may also be given between thin pieces of bread and butter, or in rice papers or wafers.

A pill, capsule or tablet is more easily swallowed if placed well at the back of the tongue. Purgative salts should be dissolved in about a third of a glass of water unless otherwise directed. Gargles should be diluted with a little water.

When medicine is directed to be given three times a day it should be given after the three principal meals; when four times, it will be convenient to give it at 8 a.m., noon, 4 p.m. and 8 p.m. The times of giving drugs to a patient requiring systematic nursing should be noted down. If the nurse should forget to give a dose at the proper time on no account should she increase the next dose when it falls due. *See* Apothecaries' Weights and Measures; Domestic Measures; Dose; Drug; Enema; Inhalation; Injection; Suppository.

MELANCHOLIA. *See* Mental Disease.

MÉNIÈRE'S SYNDROME. A group of symptoms which are habitually associated is called a syndrome or complex. In Ménière's syndrome the symptoms are giddiness, deafness and noises in one or both ears, and sickness and vomiting. Between the attacks the patient may be free from giddiness, but sometimes more or less unsteadiness persists. The treatment during an attack is to keep the patient at rest in a darkened and quiet room and restrict him to a light diet. Such symptoms come on suddenly and with great severity when bleeding occurs into the internal ear, or labyrinth, in which case the condition is described as Ménière's disease. *See* Dizziness; Ear.

MENINGES. The coverings of the brain and spinal cord, known as the meninges, are three in number. In order from without inwards, there is the dura mater, the arachnoid and the pia mater, the meninges of the brain being continuous with those of the cord through the foramen magnum of the skull. The dura mater, which is a thick, strong membrane, lines the skull and the spinal canal. The arachnoid and the pia mater are more delicate membranes, the latter being closely applied to the surface of the brain and cord and dipping into the fissures and sulci. Between these two meninges is the sub-arachnoid space, filled with cerebro-spinal fluid. *See* Brain; Skull.

MENINGITIS. Inflammation of the coverings of the brain is known as meningitis, but, for practical purposes, when one speaks of meningitis it is inflammation of the innermost membrane, the pia mater, that is meant. Meningitis may be caused by extension of sepsis from a diseased middle ear, from the orbit, the nose or the face or scalp ; or the infection may be brought by the blood, in pyaemia. This is called the suppurative type The meningococcus is the cause of epidemic cerebro-spinal meningitis, and of posterior basal meningitis, which occurs, almost exclusively, in young infants. Tuberculosis is another cause, and chronic meningitis may occur from alcoholism and from syphilis.

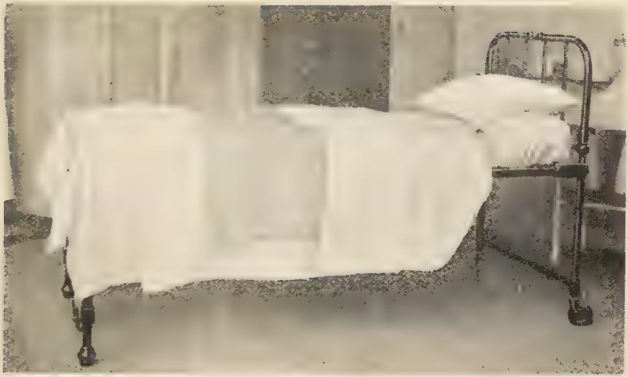
In the suppurative type of meningitis there is headache, giddiness, fever, which is often high, intolerance of light, sound and touch, delirium and vomiting. There may be twitching and spasm of muscles, and convulsions, especially in children. The head is usually drawn back. There may be squinting of the eyes, and possibly facial paralysis. Sometimes there is paralysis of a limb or of one side of the body. Unconsciousness deepens into coma. Tuberculous meningitis forms part of a general infection with the tubercle bacillus, and the mischief is mainly situated towards the base of the brain. For a short time before the onset of symptoms definitely pointing to meningitis a child shows signs of ailing, goes off its food, loses flesh and is peevish. Symptoms resembling those above described then supervene. After some days the child sinks into profound unconsciousness. Epidemic cerebro-spinal meningitis is discussed under the heading cerebro-spinal fever.

The treatment of meningitis consists in keeping the patient quiet in a darkened room and keeping the head cool. The head is shaved, and cooling lotions applied or an ice-bag or Leiter's tube (q.v.). By lumbar puncture cerebro-spinal fluid is allowed to drain away sufficiently to relieve tension, and in the meningococcal types serum may be injected. Feeding may have to be done through a nasal tube. If the temperature is high it must be lowered by sponging. Drugs may be required for symptoms. *See* Brain ; Cerebro-Spinal Fever ; Meninges.

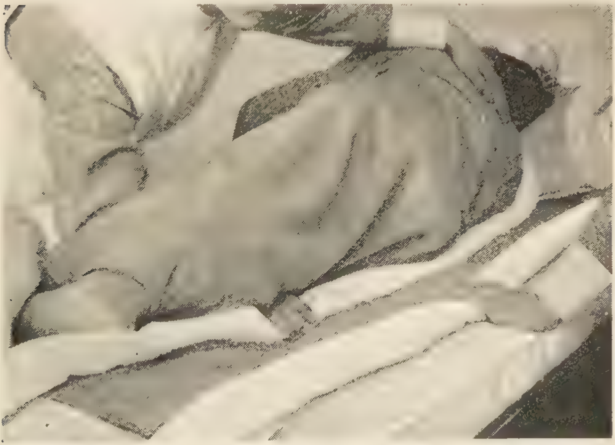
MENOPAUSE. *See* Change of Life.

MENSTRUATION. The periodical discharges in women referred to as "the monthlies," the menstrua, the menses, the periods, and by other names, are associated with the function of child-bearing. The lining of the womb undergoes changes to fit it for the reception of a fertilised ovum, but when pregnancy does not occur part of the lining is shed and this occasions more or less bleeding.

Menstruation goes on from puberty to the change of life, lasting probably about thirty years. In temperate climates it begins about the age of fourteen as a rule. Generally the time elapsing between the beginning of one period and that of the next is twenty-eight days, but some women normally menstruate

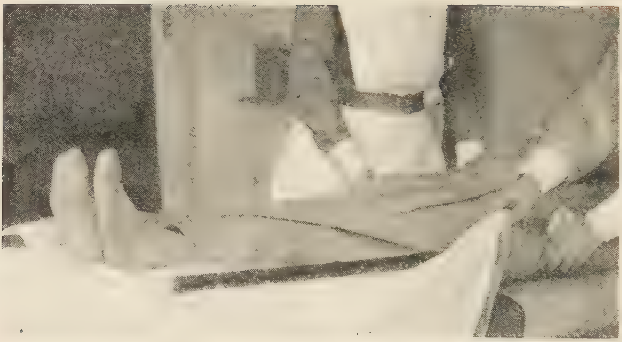


An iron bedstead is the most suitable for the sick room. It should have a spring mattress over which is laid a horsehair mattress covered with a sheet. Over this a rubber sheet should be spread, and above it a folded piece of sheeting to form the draw sheet. The patient should be covered with a sheet, two blankets and a bed cover

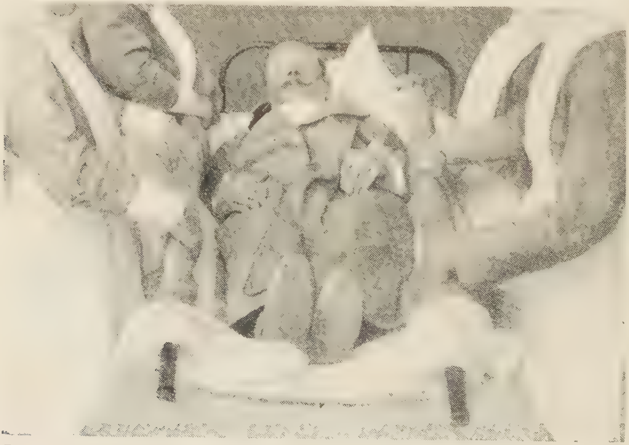


Changing a sheet beneath a patient. The fresh sheet is here rolled along its length ready to be fixed beneath the mattress. The patient is turned on his side and the soiled sheet is first rolled and passed beneath him, followed by the clean one

A SICKROOM BED AND HOW TO CHANGE A SHEET

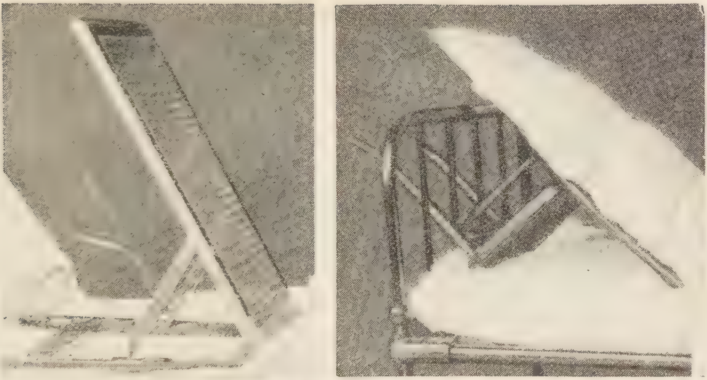


When moving a helpless patient, two poles are first rolled up in the sheet and blanket on which he is lying, one on either side, as shown in the illustration

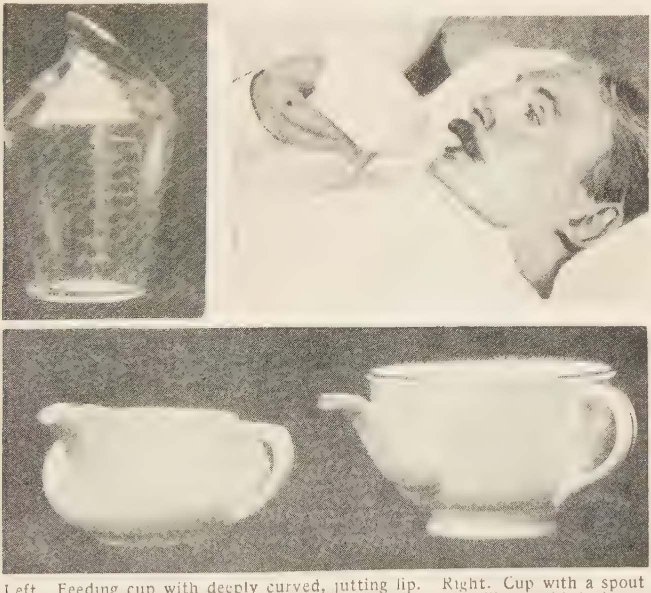


Two bearers on either side raise the patient clear of the bottom rail of the bed, carry him forward over the bottom of the bed and lay him on a second bed, which is placed end to end with the first

HOW TO MOVE A HELPLESS PATIENT



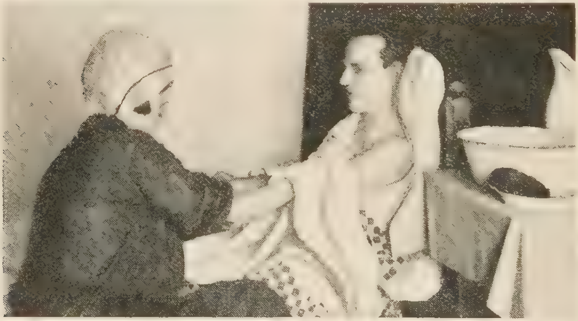
Left. A light but strong type of bed-rest consists of a wooden framework with a cane back, the slope of which can be varied. Right. In homes where a bed-rest is not available it is easy to improvise a substitute by using a light chair as shown



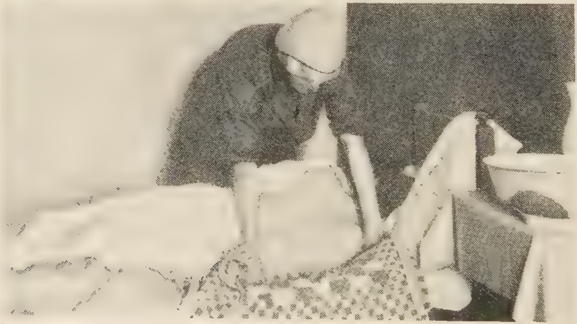
Left. Feeding cup with deeply curved, jutting lip. Right. Cup with a spout like a teapot and a cover over half the top to prevent spilling this is shown in use, above, right. Above, left. A graduated glass by which the nurse is able accurately to measure the amount given

ACCESSORIES FOR THE SICKROOM

The whole body should be cleansed with soap and water, one part at a time, bedding being protected by a thick towel below the part



The part is dried gently but thoroughly before proceeding to expose another part; irritated portions of skin may be dusted with powder



Especial care must be given to the back and other parts like elbows and heels, which, being exposed to pressure, are prone to bed sores

WASHING : DAILY ROUTINE FOR BEDRIDDEN PATIENTS

every three weeks, and others at intervals just short of five weeks. The ordinary duration of a period is four or five days, and the amount of discharge may vary from two to eight ounces. If very profuse or if it causes exhaustion the possibility of some abnormality must be considered. A period may be preceded and accompanied by a feeling of fulness in the lower part of the abdomen and by a feeling of lassitude. Sometimes there is a definite pain, or dysmenorrhoea.

Menstruation is a physiological process and calls for no great change in the ordinary habits. A moderate amount of open-air exercise is more beneficial than otherwise, but chilling of the feet and legs should be avoided as far as possible. Baths, provided they are not cold, may be taken throughout the period.

Cessation of menstruation, or amenorrhoea, is a normal incident in pregnancy and lactation. Otherwise it may be due to a local or a general disorder. *See* Amenorrhoea; Change of Life; Dysmenorrhoea; Flooding; Pregnancy; Womb.

MENTAL DISEASE. The majority of people can be described as sane, but that is not to say that they enjoy perfect mental health. Probably this could only be said of a few, the rest presenting some degree of depreciation, slight in most cases, but in others quite considerable. Insanity thus forms but a portion, and a relatively small one, of the province of mental disease.

In the study of mental diseases it is necessary to bear in mind that there is an organic continuity between body and mind, and this connexion means more than merely the part taken by the brain, as mental processes are largely influenced by the general activities and states of the body, and notably by the action of the internal secretions or endocrines (q.v.). Mental disorder may be merely symptomatic of some bodily disorder, or inflammation, tumour, or other disease of the brain, for example, of the action of poisons, such as alcohol or Indian hemp, on the brain, or of general diseases, as in the delirium of fevers. Consumption, heart disease and other disorders may also be attended by mental disturbance of one kind or another.

There is, however, a large amount of mental disease which cannot be connected with any changes in the organs of the body, nor with any kind of poisoning. Heredity plays an important part in the causation of mental disease, and especially in the first half of life. Other important factors are the infection of syphilis, which causes general paralysis of the insane and other mental disorders, and alcohol, which leads to a variety of disorders. The state of the bodily health and ease or otherwise in obtaining a living are also significant, and especially in the latter half of life. Sex is another important factor. To mate with a member of the opposite sex is the natural destiny of a sexually mature individual, and frustration of this may occasion mental disorder.

Insanity is more apt to occur at the great epochs of life, namely, puberty, the menopause or change of life, and the onset of old age. At puberty the body comes under the strong influence of the secretions of the sex glands, while at the menopause this influence is diminished and withdrawn; in either instance there may be some interference with the balance normally maintained between the actions of other internal secretions. The danger at the onset of old age may possibly be due to similar chemical changes, but arterial degeneration, by impairing the nutrition of the brain, is of greater importance.

Broadly speaking, there are three classes of symptoms, namely, neuroses, psychoneuroses and psychoses. In the first are comprised neurasthenia, the chief characteristic of which is that mind and body are easily fatigued; anxiety neurosis, which is a constant state of nervous apprehension; and hypochondriasis. The bodily state has much to do with their causation. The psycho-neuroses include hysteria, which may either take the form of conversion hysteria or of anxiety hysteria, and the obsessional or compulsion neurosis. In these disorders the state of the body is of little account as regards causation.

The third class, the psychoses, which are usually described as the mental diseases proper, are those which may lead to such conduct as will label the sufferer with insanity (q.v.). Here are included the following types:

(1) *Organic Changes in the Brain.* Mental diseases resulting from general paralysis of the insane (q.v.) and other disorders dependent on syphilis or on arterial disease, tumours or encephalitis, or which follow an apoplectic seizure or an injury to the brain. Such are mainly of the nature of dementia.

(2) *Idiocy* (q.v.) *and Feeble-mindedness* (q.v.).

(3) *Toxic Psychoses*, that is, disorders due to poisoning, usually chronic poisoning, and especially with alcohol, lead, morphine or cocaine; occasionally insanity is due to mercury poisoning.

(4) *Epilepsy.* Insanity may be associated with epilepsy (q.v.).

(5) *Dementia Praecox.* This form of insanity may be manifested from the age of fifteen onwards, but the tendency is much lessened after the age of forty. Only about 15 per cent of cases recover.

(6) *Manic-depressive Insanity.* When insanity is marked by violent excitement it is described as mania; marked by painful mental depression it is melancholia. A patient may suffer from one or other of these or from each alternately. There is a special tendency to suicide in melancholia.

(7) *Paranoia.* In this type the chief characteristic is a delusion of persecution, though it may be of grandeur. Delusions occur in other forms of mental disorder, of course, but they are fleeting and change in character. In paranoia the patient clings to his delusion and regulates his conduct by it.

(8) *Confusional Insanity.* After influenza or some other debilitating disease, childbirth, or a surgical operation, or excessive fatigue, a person may suffer from great confusion of thought, especially as regards dates and persons. Recovery within a year is the rule.

(9) *Acute Delirious Mania, or Bell's Disease.* In some circumstances, such as those mentioned above as causing confusional insanity, or from auto-intoxication (q.v.), a person may suddenly become intensely restless and excited, with hallucinations which are of a terrifying character. Early treatment may save life.

(10) *Dementia.* A damping-down or loss of all the mental faculties, or dementia, is the outcome of many of the disorders already described, but it may occur as a primary condition.

A large amount of mental disease is preventable. That due to heredity, however, could only be prevented by suitable marriage. The marriage of a person from a tainted stock with one belonging to a sound stock is said to be one of the ways in which a taint is destroyed for subsequent generations, but, whatever are the chances of this happening in a marriage of this kind, it is thoroughly established that if both parties come of neuropathic stock the outlook is very bad for their progeny. Any person with a neuropathic inheritance should be a total abstainer.

The modern treatment of syphilis, if effectively carried out, will diminish enormously the incidence of general paralysis of the insane, and of the other mental disorders due to the infection. Public health measures, by diminishing disease generally, and educational and economic measures which raise the standard of comfort of the poorer classes and lessen the stress of their struggle for existence, will also be beneficial. The stress of living for many persons, whatever their social position, would often be lessened by a more judicious choice of vocation; this applies with special force to those in whom the mental staying power and elasticity have been weakened by inheritance. Young people often need help in establishing easy social relations and in regulating the conditions of the sexual life.

MENTAL HYGIENE. It is generally recognized that a proper development of the body and sound bodily health depend upon the maintenance of good hygienic conditions, but the fact that there is a need for a careful mental hygiene is not so well appreciated. The influence of bodily on mental health is recognized, of course, and, so far as a healthy mind can be secured by making and keeping the body healthy, much public and personal effort is being directed towards mental hygiene. It is clearly established however, that much mental disease is purely, or mainly, psychical in origin, that is to say, it comes from wrong thinking and is more or less uninfluenced by the state of the bodily health, though, on the other hand, it may cause derangement of the functions of the body. It may be said that secular and religious education are directed towards building up a healthy mind, and certainly when the methods and aims of such instruction are properly directed good hygienic habits are inculcated.

This result is attained more or less when the main object in view is not so much what a child will know as what it will become. The lamentable failure that too often attends years of effort in education does not so much consist in the fact that most of what has been taught is speedily forgotten as that the young person emerges on life without mental or moral interests and with a very inadequate capacity of taking his, or her, place as a social unit. It is in the nature of things that an individual should be profoundly interested in his own personality, but a good education and training will keep him from being wrapped up in himself. Also it is in the nature of things that an adolescent will be subjected to a strong sexual urge, but a sound training will help to control his importunate impulses and turn them into channels that are expedient.

MENTHOL. A colourless, crystalline substance with a pungent taste and smell, menthol is obtained by cooling the oil distilled from several varieties of mint herb, including peppermint. It is a powerful antiseptic, though not much used for this purpose. It is also an anaesthetic, and may remove neuralgia or itching. For these purposes it may be rubbed on the skin in a solid form, applied in an alcoholic solution, or used in the B.P. menthol plaster. Solutions of menthol are sprayed into the nose and throat by means of an atomiser (q.v.). This relieves the stuffiness of the nose and irritation in the throat. Other methods of using it are with hot water as an inhalation (q.v.), or menthol snuff or menthol lozenges.

MERCURY. A metallic element, which is in a liquid state at ordinary temperatures, mercury, quicksilver or hydrargyrum is extensively used in medicine. It is a valuable remedy for syphilis, and in the treatment of this disease preparations of the drug may be given by the mouth, by intra-muscular injections and by inunction. The powder of mercury and chalk, commonly known as grey powder, dose 1 to 5 grains, is often selected for the oral administration, in doses of 1 grain three or four times daily. Grey powder is a favourite remedy for diarrhoea in children, with offensive stools, 1 grain for a child one year old. Other preparations of mercury used as purgatives are the mercury pill, or blue pill, and subchloride of mercury, or calomel, dose ½ to 5 grains. It is customary to combine other purgatives with these, often a saline, the mercurial preparation being taken at bedtime and the saline in the morning

Corrosive sublimate and the biniodide are used for preparing antiseptic (q.v.) solutions and are powerful agents of this kind. They are, however, extremely poisonous. The yellow and the black mercurial lotions are chiefly used for washing syphilitic sores. The acid solution of mercuric nitrate has a caustic action. Lotions of the perchloride or of the biniodide of mercury may be used to destroy skin parasites, or, if an ointment is preferable, that of mercury, often referred to as blue ointment, or that of ammoniated mercury, or white precipitate ointment. The latter is used in treating chronic skin diseases, such as eczema or psoriasis; also useful here is the weak nitrate of mercury, or citrine, ointment. The yellow oxide of mercury, or

Pagenstecher's ointment, is much used in treating chronic inflammation of the lids or conjunctiva. The compound mercury or Scott's ointment is sometimes used as a resolvent, that is, to remove chronic inflammatory swellings.

POISONING BY MERCURY. A person taking mercury in medicinal doses may suffer from symptoms of over-dosage. The signs of this condition are an excessive flow of saliva, a coppery taste in the mouth, a foul breath, soreness and perhaps ulceration of the gums, loosening of teeth and possibly necrosis of the jaw. This condition is less likely to occur if the teeth and mouth are thoroughly cleansed after each meal, and if the patient does not smoke. Treatment consists in discontinuing the drug and the use of a mouth wash containing potassium chlorate. Acute mercury poisoning from swallowing one of the preparations, most commonly corrosive sublimate, is characterised by a burning pain in the mouth, throat and stomach, vomiting, abdominal pain, diarrhoea and collapse. An emetic should be given and the white of one or two eggs. Milk, flour and water and lime water may also be given. The patient must be kept lying down and warm. Stimulants are likely to be needed. *See* Antiseptic; Corrosive Sublimate; Poisoning.

MESENTERY. The peritoneal fold attaching the small intestine to the posterior abdominal wall is called the mesentery. It consists of two layers, and between these are the blood vessels, nerves and lymphatics, including lymphatic glands which supply the bowel. *See* Intestine; Peritoneum.

METABOLISM. Living tissues assimilate foodstuffs and build them into their own substance, a process described as anabolism, or building up. For the exercise of their functions, on the other hand, a certain disintegration of their substance is necessary. This is described as katabolism, or breaking down. The sum of these activities is called metabolism. Carbonic acid gas is a product of katabolism, and the amount breathed out is a measure of metabolic activity, as building up must keep pace with breaking down, at any rate in health.

Basal metabolism means the amount of tissue change necessary simply to carry on life, or what goes on when a person is at complete rest mentally and physically. The estimation of the basal metabolic rate may be useful in studying disturbances of the thyroid and pituitary glands. *See* Diet; Growth.

METHYLATED SPIRIT. What is now sold as methylated spirit consists of a mixture of ethyl alcohol with small quantities of methyl alcohol, or wood spirit, crude pyridine and mineral naphtha or petroleum, coloured with methyl violet. This is more properly referred to as mineralised or denatured spirit. It is suitable for burning in spirit lamps, but whereas the old form of methylated spirit could be used freely on the skin with perfect safety, denatured spirit, if so used, may cause dermatitis.

When mineralised spirit is taken, its effects are like those of ordinary alcohol, but more slowly produced and more lasting.

Moreover, very dangerous effects may be manifested, such as convulsions or blindness. The stomach should be emptied, by an emetic if the patient is conscious, and hot tea and coffee given freely, warmth being maintained by blankets and hot bottles.

METHYL SALICYLATE. A synthetic product, methyl salicylate is identical with the active constituent of oil of wintergreen or gaultheria (q.v.). It is a remedy for rheumatism.

METRORRHAGIA. Bleeding from the womb, except that associated with menstruation, is called metrorrhagia. It is important to distinguish such bleeding from menstruation, especially about the time of the change of life. An early investigation would prevent many deaths from cancer. *See* Womb.

MICTURITION. The act of passing urine is called micturition, or urination. Its mechanism is controlled by a centre in the lumbar region of the spinal cord, so that micturition can occur during unconsciousness, but ordinarily, even during sleep, the centre is controlled by the brain.

The bladder is normally emptied three or four times a day, and it is not necessary to get up at night. The frequency of micturition is usually greater in cold weather, as more liquid is excreted by the kidneys and less by the skin; excitement may also increase the frequency. Undue frequency of micturition may be due to inflammation in the urinary tract, in the kidney, the bladder or the urethra, or the irritation of the tract may be due to a stone or a growth. In elderly men an enlarged prostate is another cause. The undue frequency may be caused by an excessive amount of urine passing through the kidneys, as in diabetes, mellitus or insipidus, and in chronic Bright's disease, or to excess of acid or the presence of other irritants in the urine. Irritation outside the urinary tract, as in the lower bowel and, in females, the womb, is sometimes responsible.

When the act of micturition is painful and spasmodic, with a feeling of urgent necessity to pass water although there may be little or none in the bladder, it is described as dysuria, strangury or bladder tenesmus. Inability to hold the water, or incontinence of urine, may actually be due to overfilling of the bladder, what comes away representing merely the overflow. Incontinence in children, which may be caused by threadworms, or a tight foreskin, is discussed under the heading Bedwetting.

Inability to pass urine may be due to its retention in the bladder because of weakness in the latter or obstruction to the flow, or it may be due to anuria, a cessation of urine formation by the kidney (q.v.). The treatment of disorders of micturition depends on the cause, and this can usually only be determined by expert examination. Pain may be eased, at any rate temporarily, by putting hot poultices or fomentations over the bladder, or by the use of a hot bath. *See* Bladder; Strangury; Urine.

MIGRAINE. A paroxysmal type of headache, migraine or megrim is usually accompanied by sickness and vomiting, and so is called sick-headache also. Heredity often plays a part in its causation, and there may be a gouty habit. Eye strain, carious teeth and nasal or aural disease sometimes are responsible, at any rate in part.

Warning of an attack may be given by tingling sensations in the limbs, impairment of vision, flashing lights, a vision of battlements, noises in the ears, mental depression or other phenomena. The pain is described as being of a sharp, boring character, and may begin in the temple, in the eyeball or in the forehead, and it tends to spread. Vomiting may relieve it, but in any case the patient is prostrated.

If there is warning of an attack, a sharp saline purge may avert it. During an attack the patient should lie down in a quiet room with hot-water bottles at his feet. Sometimes hot or cold applications to the head, or a mustard plaster at the nape of the neck, may be beneficial. Phenacetin, antipyrin and similar drugs are given, but repeated doses should not be given without medical advice. In the intervals of attacks the state of the eyes, nose, mouth and ears should be examined to determine whether or not there is any local cause for the headache. A strict vegetarian diet is often most suitable. The bowels should be kept freely open. *See* Headache.

MILIARIA. Two skin affections, characterised by tiny vesicles or blisters, are described as miliaria. In acute fevers tiny clear vesicles resembling droplets of water may appear, especially on the chest, abdomen or neck. The skin around the blister has a normal appearance, and there is no itching or other disagreeable sensation. Such blisters are called sudamina. They rupture spontaneously and disappear, leaving no trace of their presence. No treatment is necessary. Miliaria rubra or papulosa is another name for prickly heat (q.v.).

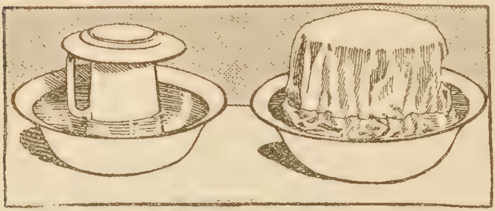
MILK. The young of all mammals depend on the mother's milk for their entire subsistence during the earliest period of life, and milk must therefore contain all the ingredients of a diet, namely, proteins, fat, carbohydrate, salts and vitamins, in addition to water. In the following table the average percentage composition of human milk and of others in use is set out.

	Human	Cow's	Goat's	Mare's	Ass's
Proteins	1·70	3·55	4·30	1·31	2·25
Carbohydrate ..	6·45	4·88	4·46	5·67	6·00
Fat..	3·78	3·69	4·78	1·21	1·65
Salts	0·20	0·71	0·75	0·36	0·50
Water	87·87	87·17	85·71	91·45	89·60

There are two proteins in milk, one that forms the curd when milk is acted on by rennet, this being known as caseinogen, and another which coagulates when milk is boiled and is known as lactalbumin. The latter is the more easily digested and the more suitable form, therefore, for young infants. In human milk the two proteins are about equal in quantity, but in cow's milk the proportion of caseinogen to lactalbumin is about 5 or 6 to 1. Dilution of cow's milk does not always get over the difficulty, therefore, and it may be necessary to peptonise milk in order to get it partially digested before giving it to an infant. The milk of the ass has a large proportion of lactalbumin, 2·3 to 1 of caseinogen, and may be useful for an infant with a weak digestion, but it cannot be continued for long as it has too little fat.

In milk the fat is in tiny droplets diffused through the liquid, which is in fact an emulsion. On standing, the larger drops of fat adhere and rise to the surface as cream, the residuum, or skim milk, retaining most of the other contents of the milk and therefore having a considerable food value. It may be used when fats are not easily digested. The carbohydrate of milk consists of milk-sugar, or lactose. The souring of milk is due to the conversion of this sugar into lactic acid. The salts in milk include the chlorides of sodium and potassium, calcium phosphate and salts of iron. Milk contains all the vitamins necessary for healthy growth.

The cows from which our milk supply is obtained are often unhealthy, and slovenliness in the management of byres, in milking, and in the handling of milk and milk utensils at the farm and on its way to the consumer, may lead to contamination with diet and possibly disease germs. Tubercle bacilli of the bovine type are often found in milk, and other germs which may be readily carried in milk are those of diphtheria, scarlet fever, typhoid fever and the summer diarrhoea of infants. Two views of a model dairy farm are given in Plates 42 and 43.



MILK. Two methods of keeping it cool and clean

To further the purity of the public milk supply in Great Britain, the Ministry of Health has arranged for the licensing of dairy-farms and dairies to sell various categories of milk which fulfil the requirements laid down in the Milk Special Designations Order, 1923. It must be pointed out, however, that contamination of milk may easily occur in the home unless it is kept in clean utensils in a clean, cool larder and efficiently covered to protect it from dust and flies. When brought to table it must also be covered if flies are about. If the milk is not of the tuberculosis-free categories, it should be boiled before being given to young children. In hot weather milk should be kept on ice. Nothing short of boiling will kill tubercle bacilli, but other forms of infection may be destroyed by pasteurisation. This can be done in an apparatus sold for the purpose or in a double saucepan, the milk being kept at a temperature between 145° to 150° F. for at least half an hour and then cooled rapidly.

To peptonise milk, two-thirds of a pint is diluted with one-third of a pint of water and heated in a saucepan to a temperature of 140° F. If a thermometer is not available, the correct temperature can be obtained by bringing one half of the diluted milk to the boil and then adding the other half. The heated milk is put into a jug and two drachms of Benger's liquor pancreaticus and 20 grains of sodium bicarbonate are added and stirred in. The jug is then covered with a cosy and left for from ten to twenty minutes, according to the amount of action required, when the milk is brought to the boil to stop the action.

If rennet be added to milk, the caseinogen is converted into casein, and this forms a curd in which most of the fat is entangled. The liquid which remains, the whey, has a slight food value and is sometimes used in feeding infants and the sick. When milk is churned, some of the fat remains in the buttermilk. This can often be taken by those who dislike ordinary milk. Tablets or powders containing the Bulgarian or the Caucasian bacillus are used for the artificial souring of milk. The sour-milk cure is based on the probability that the growth of the lactic acid bacilli in the bowel will lessen the activity of the bacilli which give rise to harmful products from the decomposition of proteins in food. Koumiss in its original form is mare's milk which has undergone alcoholic fermentation, besides being soured. Kephir is a similar preparation made with cow's, goat's or sheep's milk. These foods are easily digested, and may be useful when the digestive powers are enfeebled. *See* Casein ; Condensed Milk ; Food ; Invalid Cookery ; Lactic Acid ; Tuberculosis ; Whey.

MILK SUGAR. The sweetness of milk is due to the presence of a sugar of the same group as cane sugar and known as lactose or milk sugar. *See* Sugar.

MIND. The brain is the organ of mind. Mental activity is associated with the discharge of energy by brain cells, and its conduction along the nerves, formed by the processes of these cells, in numerous directions. Some of the impulses go to other cells in the brain, which in turn themselves discharge energy or manifest some other metabolic change, while others pass to or from organs and tissues throughout the body. The groundwork of our minds is knowledge, derived through the senses, of what goes on outside our bodies and, to some extent, within them. This knowledge is registered in the brain in some way and is utilisable in the processes of thinking. The urge towards the satisfaction of instinctive and acquired desires exercises a profound influence of the processes of thought. There is, however, a kind of mechanism in the nervous system known as inhibition, that is, a power to control or regulate bodily activities of some kind. and something of this sort grows up in the mind as notions of what is right and expedient, conjoined more or less with a sense of disagreeable consequences attaching to the disregard of such notions. Thus, there is in the mind a conflict of ideas, desires for the satisfaction of animal cravings, for example, or a desire to turn one's back on dangers and difficulties conflicting with the desire for self-respect or for the respect of others.

If a desire be sufficiently urgent, it and the network, or complex, of ideas associated with it are simply repressed and the desire continues to press for satisfaction. It obtains this in various ways. One way is through dreams. A second method is by what is known as sublimation, that is, the transfer of the energy inherent in repressed ideas to such as can be entertained, for example, to mysticism, to philanthropy and so on. A third method is the process of rationalisation ; the wish is allowed satisfaction but the fact is concealed from the individual by the tissue of argument which he weaves around it. A fourth method by which a truce is called to mental conflict is by the development of some kind of psycho neurosis. The performance of a dangerous or very disagreeable duty may be avoided by paralysis of an arm or of a leg, for example, the mental and nervous processes through which this is brought about taking place unconsciously and thus differing altogether from pure malingering.

For successful thinking there must be adequate concentration, or attention, and this implies a considerable mobilisation of nerve energy which expresses itself not only in the mental effort but affects the whole body. This explains why concentration causes fatigue, sooner or later. *See* Auto-suggestion ; Neurosis ; Psycho-therapy.

MISCARRIAGE. What is usually meant by the term miscarriage is termination of pregnancy before the end of the 27th week, though strictly it means an accident of this kind between the end of the 12th week and the end of the 27th, the loss of the foetus before the end of the 12th week being called an abortion. *See* Abortion ; Childbirth ; Pregnancy.

MOLE. A variety of birth mark is called a mole, or pigmented mole. It is a tumour formation in the skin, consisting of cells containing pigment and covered by normal epidermis. It may be of minute size or may cover extensive areas.

A mole may take on malignant characters in later life, especially if it has been irritated much by rubbing or otherwise, and the cells may be disseminated throughout the body. When feasible it may be desirable, therefore, to get rid of moles, but this should be done by a doctor, as unskilful treatment might precipitate malignancy. *See* Birth Mark ; Electrolysis ; Skin.

MOLLUSCUM. Two types of soft growth are described as molluscum. One occurs in the disease known as molluscum contagiosum, in which tiny, hemispherical swellings appear on the skin, usually on the face or external genitals, but perhaps on the hands or elsewhere on the body. They grow to about the size of a pea and the colour may be like mother-of-pearl or yellowish brown. The disorder is communicable from one person to another. The tumours are not troublesome unless they suppurate, and only in this event do they leave a scar when they disappear. The disease, which is more common amongst the poor, is successfully treated by squeezing out the plugs and disinfecting the cavity that remains.

Molluscum fibrosum, or fibroma molluscum, is quite a different disorder. Here a growth formed of soft tissue occurs in the connective tissue surrounding nerve trunks, and from this may result rounded swellings, which may remain below the skin level or protrude from prominent folds of skin. Tumours that protrude commonly become pedunculated, that is to say, develop a narrow neck attaching them to the skin. The skin over them may be wrinkled, but it preserves its normal tint unless, as often happens, there is an overgrowth of blood vessels, forming a naevus, within the tumour, when a bluish tint is acquired. Molluscum fibrosum is probably always congenital in origin. Small growths may be removed.

MORNING SICKNESS. *See* Pregnancy.

MORPHIA. The chief active principle of opium is the alkaloid morphine, or, as it is popularly called, morphia. Chronic poisoning from the morphia habit is called morphinism. *See* Drug Habits ; Opium.

MORTIFICATION. *See* Gangrene.

MORTON'S DISEASE. Severe pain in the front part of the foot from pressure on nerves is called Morton's disease, or metatarsalgia. The treatment is discussed under the heading Foot.

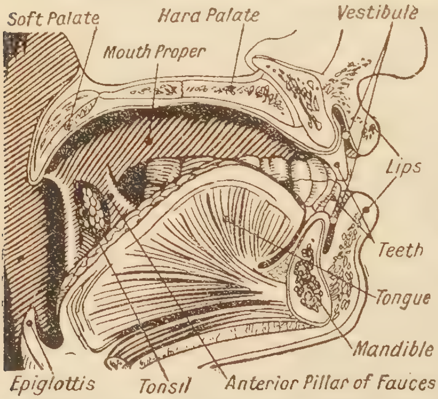
MORVAN'S DISEASE. A person suffering from the disease of the spinal cord known as syringomyelia (q.v.) may develop painless whitlows, a condition described as Morvan's disease.

MOSQUITO. An important part is taken by different species of mosquito in disseminating certain diseases. The species concerned belong to two great groups of mosquito, the anopheline and the culicine. The female mosquito sucks blood, because this contributes to the maturation of her eggs, and in the process may inject disease organisms she may happen to be carrying.

The anopheles maculipennis and other anophelines are malaria-carriers. Of the culicinae, culex fatigans carries the filaria worm and possibly dengue ; stegomyia or aëdes fasciata carries yellow fever, and other species of stegomyia carry the filaria worm. Septic germs are also sometimes inoculated by mosquitoes. Anopheles as a rule bite at night, but stegomyia are most active in the early afternoon.

The first protective measure against mosquitoes is to prevent their breeding by getting rid of stagnant water, by drainage, and by filling in pools. If this is not possible, paraffin may be poured on the surface of the water so as to cover the pool. Wells or open cisterns should have a cover of close gauze or netting. A dwelling-house should be as far as possible from marshes or other collections of stagnant water, and the ground around it should be cleared of brushwood. The doors and windows should be efficiently screened by netting or gauze. Unless the house is sufficiently protected the inmates should always sleep under a mosquito net. Should it be necessary to go out at night the face may be protected by a net attached to a helmet or suitable framework, and the hands by gloves. Thick stockings or puttees are advisable. Treatment is discussed under the heading Bite. A solution of an ounce of magnesium sulphate in 10 ounces of water daubed over exposed skin and allowed to dry on is said to prevent bites ; or the skin may be smeared with vaseline, with which has been mixed a little oil of citronella, of cloves or some other fragrant oil. *See* Anopheles ; Bite ; Filaria ; Malaria ; Tropical Hygiene ; Yellow Fever.

MOUTH. Two parts of the mouth may be distinguished, namely, the vestibule, or space between the lips and cheeks and the teeth and gums, and the cavity of the mouth proper, behind the teeth and reaching to the fauces, where the mouth becomes continuous with the pharynx. The roof of the mouth proper is formed by the hard palate and on the floor lies the tongue. The whole cavity of the mouth is lined with mucous membrane.



MOUTH. Diagram showing the principal parts

The mouth is kept moist chiefly by the saliva (q.v.). This juice, the product of several glands, also assists in mastication and has important uses in digestion. Dryness of the mouth is common in mouth-breathers. It may occur from fear and in fevers and other disorders. A disorder characterised by constant and excessive dryness of the mouth is called xerostomia.

Inflammation of the mouth is called stomatitis and may assume various forms, according to the cause. Simple stomatitis may be caused by excessive smoking, by condiments or other irritants, or by indigestion ; or it may have a bacterial cause, as in an ordinary cold or an eruptive fever. The lining becomes red and is dry at first, but afterwards there is excessive secretion. The mouth should be kept clean, and a solution of bicarbonate of sodium will help towards this. In aphthous, follicular or vesicular stomatitis, which affects children mostly, little vesicles or blisters form on the inside of the lips and teeth and on the edges of the tongue. Errors of digestion should be corrected.

Ulcerative stomatitis tends to affect children in poverty-stricken households. The gums swell and become ulcerated, sores also forming on the lining of the cheeks. There is a free flow of saliva and the breath is foul. The glands below the jaw may be enlarged. A mouth wash (q.v.) containing potassium chlorate should be used, small doses of the drug also being swallowed. The general health must be improved by better hygienic conditions and good food. Gangrenous stomatitis is also called cancrum oris (q.v.). Thrush is a form of stomatitis caused by the growth of a fungus, oidium albicans. *See* Gum ; Palate ; Ranula ; Salivary Gland ; Teeth ; Tongue.

MOUTH WASH. When it is merely to relieve a dry, sticky feeling, a mouth wash consisting of a pinch of common salt, sodium bicarbonate or borax, or of a combination of each, in half a glass of water will suffice. When the breath is foul a solution of permanganate of potassium, enough of the latter to make the solution red, is useful, though it may be desirable to gargle with this also. In ulcerative stomatitis the following should be used :

Potassium chlorate	160 grains
Glycerin	6 drachms
Water	to make 8 ounces

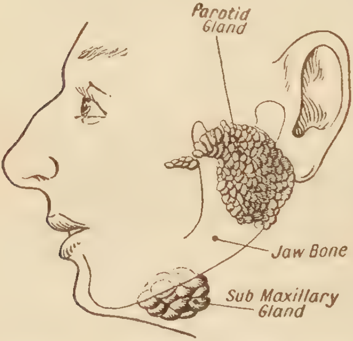
A teaspoonful to a tablespoonful, according to the age of the patient, should be swallowed thrice daily.

Hydrogen peroxide, diluted with 3 parts of water, makes a good wash, and also the compound solution of thymol B.P.C. in the same dilution.

MUCOUS MEMBRANE. The digestive, the respiratory, the genito-urinary, and other passages and hollow organs have a delicate lining, known as mucous membrane, which is kept moist by a sticky secretion called mucus. A mucous membrane has a covering of epithelial cells, which vary in shape in the various organs and passages. These cells generally rest on a basement membrane, and beneath this is connective tissue. The superficial cells of some mucous membranes, that of the respiratory tract, for example, are ciliated, or have a fringe of tiny, hair-like processes, on their free margin. By a wave-like motion the cilia propel particles resting on the mucous membrane in a particular direction. Inflammation of a mucous membrane tends to increase the secretions of mucus, a condition described as catarrh.

MUD BATH. Chronic skin diseases and chronic joint affections are sometimes treated by means of mud baths, the mud used at some places being of volcanic origin, and some being radioactive. At Bath, hot mud, made by mixing a fuller's earth found locally with the mineral water, is used in the form of packs. Local mud is also used at Woodhall. Mud baths are employed at Dax, near Biarritz, in France, at Acqui in Italy, at Rotorua and other places in New Zealand, and at other spas throughout the world. *See* Baths.

MUMPS. An acute infectious disease, mumps mainly attacks children. Inflammation of the parotid salivary glands is a characteristic feature of the disease. The causative organism appears to be a spirochaete which lurks in the mouth of infected persons. The period of incubation is from ten to twenty-two days. Malaise and soreness about the ear and throat may then occur, and tenderness may be found on drawing the finger along the under surface of the lower jaw on one side. Then a painful swelling is noted below and in front of the ear. There is pain on opening the mouth and in swallowing. Fever is present and the patient may become delirious. Usually, and within a few days, the parotid gland on the other side also becomes swollen, and sometimes the salivary glands below the lower jaw and beneath the front part of the tongue are also affected. Amongst other glands which may also become inflamed are the lachrymal gland, the testicle, the breast and the pancreas. The acute symptoms generally last for four or five days.



MUMPS. Situation of the glands affected in this inflammatory disease

A person suffering from mumps should be isolated at once, and should be kept in bed for at least eight days. Treatment includes that for fever (q.v.) generally, but hot, or sometimes cold, applications are used over the swollen glands. It may be necessary to use anodyne remedies also. Several times a day the mouth must be cleansed with a solution of permanganate of potassium, or some other antiseptic mouth wash; this is most important. Should inflammation of the testicle (q.v.), or orchitis, supervene, it must be carefully treated. Injection of blood serum, taken from a convalescent from mumps, has been used successfully as a prophylactic measure.

A person who suffers from mumps should not be considered to be free from infection until three weeks have elapsed since the appearance of swelling, and only then if the swelling has been gone for at least one week. The quarantine period for contacts is twenty-five days. *See* Gland; Glandular Fever; Parotid Gland.

MURMUR. A sound, other than the ordinary heart sounds, which is heard when listening over the heart, and which appears to be connected with the heart's action, is termed a murmur, or bruit. Murmurs may be described according to their place in the cardiac cycle as systolic, diastolic or presystolic ; according to the valve which appears to be affected, as mitral, aortic, and so on ; according to their characters, as soft, blowing, harsh, etc. ; and, according to whether they appear to be produced inside or outside the heart, as endocardial or exocardial. A systolic murmur may occur without disease of the heart. *See* Heart.

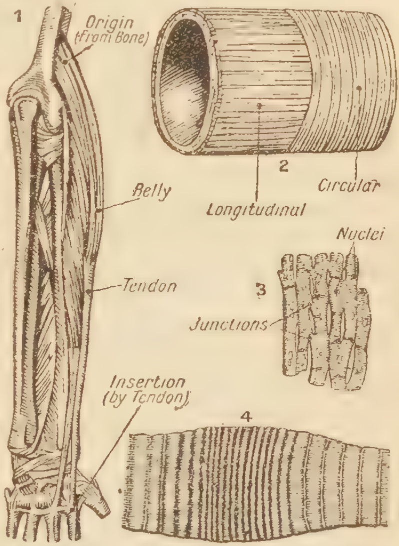
MUSCLE: STRUCTURE AND PURPOSE

With an Account of its Injuries and Diseases

Here is given a comprehensive survey of the main types of body muscles and the injuries and diseases to which they are subject. For further information see Cramp; Fibrositis: Myasthenia; Myopathy; Progressive Muscular Atrophy; Rheumatism; Sprain, etc.

There are three kinds of muscle in the body, namely, striped, voluntary or skeletal muscle, plain or unstriped involuntary muscle, and the heart muscle, which is a striped but involuntary muscle. A striped muscle is one whose fibres show cross-striping on microscopical examination, and a voluntary muscle is one which is under the control of the will. A skeletal muscle is described as having an origin and an insertion. Thus, the biceps muscle has its origin on the shoulder blade and is inserted into the radius, a bone of the forearm.

The fleshy part of a muscle is generally referred to as the belly of the muscle. Muscles are of various shapes. Some, like the biceps, are rather spindle-shaped, others, like the sartorious, form long, narrow ribbons, and others still, like those in the anterior abdominal wall, form broad, thin sheets. A muscle is enclosed in a sheath and is made up of bundles separated by connective tissue. The bundles are composed of fibres about one inch long and $\frac{1}{500}$ in. across, each fibre being enclosed in an elastic sheath, known as the sarcolemma. Plain muscle is found, among other situations, in the walls of the hollow organs, that is, the alimentary tract, the ureters and bladder, the Fallopian tubes and womb, and so on. Heart muscle is composed of striped cells, forming fibres which are carried round the chambers.



MUSCLE. 1. Parts of a voluntary muscle. 2. Smooth involuntary muscle. 3. Fibres of heart muscle much enlarged. 4. Change in a muscle fibre during contraction

Muscle possesses irritability, that is, it responds to some kind of irritation. This takes the form of contraction; a muscle fibre, and therefore the whole muscle, becomes shorter and thicker in response to the excitation. In the case of a voluntary muscle the shortening causes movement of the bone or anything else to which the muscle is attached. In a hollow organ or tube the shortening of circular fibres narrows the lumen, or cavity, and by a rhythmical series of such contractions in the bowel the contents are pushed forward. Contraction of the heart fibres causes the emptying of the chamber round which they are spread.

It will be appreciated, therefore, that muscles perform a large volume of work. They are enabled to do this by the oxidation, or combustion, of sugar supplied to them by the blood, of which they receive a generous supply. The combustion of sugar in a muscle also liberates heat, so that blood coming from a muscle is hotter than that which goes into it. This, in fact, is the chief source of the heat of the body. Fatigue supervenes sooner or later when a muscle is being continuously exercised, and is due rather to the accumulation of waste products, and, notably, sarco-lactic acid, than to the using up of available fuel. Massage, by improving the circulation through a muscle and washing out this acid, helps to remove the sense of fatigue.

INJURIES AND DISEASES OF THE MUSCLES. Overstretching of a muscle is described as a strain. There is pain and stiffness. The muscle should be rested, and, if necessary, hot or cold applications will relieve pain. Early massage and gentle movements are necessary. A muscle may be ruptured by violent stretching when it is contracted, or by a blow when it is in this condition. The limb should be placed in such a position as to put the muscle at rest and shorten it as much as possible. The tendon of some muscles works along a definite groove, and it may chance that it becomes displaced from this groove through violence. This accident, which is popularly described as a " rick," causes pain and stiffness, and it may be possible to feel that the tendon is in an abnormal position. The malposition must be rectified by a doctor, and the limb kept at rest, probably from six to eight weeks.

Inflammation of a muscle, or myositis, may be due to one of the causes of inflammation (q.v.) in any situation, and if this cause be a microbe an abscess may result. The general symptoms and treatment of these conditions are described under their respective headings. A long-continued and frequently repeated mechanical irritation of muscle or tendon may result in fibrosis and ossification of muscle ; rider's muscle is an instance of this. Muscular rheumatism is inflammation in the connective tissue mingled throughout a muscle—a fibrositis (q.v.). A tumour composed of muscle is called a myoma.

A painful spasm of a muscle is usually referred to as cramp (q.v.). Pain in a muscle without obvious signs of inflammation is spoken of as myalgia ; it is generally due to rheumatism. An intensive use of muscles leads to an increase in their size, or hypertrophy (q.v.). Disease, on the other hand, causes a diminution in size, or atrophy.

MUSCULO-SPIRAL NERVE. Derived from the brachial plexus of nerves in the neck, the musculo-spiral, or radial nerve passes across the armpit into the arm, where it winds round the back and outer side of the humerus, dividing into two terminal branches at its lower end. It supplies the triceps and anconeus muscles and, by one of its terminal branches, the muscles which extend the wrist and the fingers. The other terminal branch supplies sensation to certain parts of the fingers. Paralysis of the nerve may occur from pressure on the axilla, as in crutch paralysis, or by pressure on the back or outer side of the arm. One consequence of paralysis of this nerve is wrist drop. *See* Crutch; Median Nerve; Ulnar Nerve.

MUSHROOM. *See* Fungus; Poisoning.

MUSTARD. The familiar yellow mustard powder consists of mixed white and black mustard seeds which have been ground. The addition of water to this mustard leads to the formation of volatile oil of mustard. As a condiment it stimulates the flow of the salivary and gastric juices and so aids digestion. It will also dispel flatulence. But in large doses irritation of the stomach is such that mustard is an effective emetic, the dose for this purpose being a tablespoonful in a glass of water.

Mustard is much used as a counter-irritant, but the effect sought from it should be restricted to reddening of the skin, as the blisters and subsequent ulcers caused by mustard are difficult to heal. The usual way to apply it is as the charta sinapis, or mustard paper, or by making a plaster. This is done by taking a tablespoonful of mustard, or more, according to the surface to be covered, and making it into a thin paste with cold water. This is spread out thin on a piece of brown paper and covered with a layer of muslin or other thin fabric. It is left on for ten to twenty minutes, or until it has reddened the skin properly. For children the mustard should be mixed with an equal part or more of flour. When the plaster is removed the skin should be washed and dried gently.

A hot bath containing an ounce of mustard to the gallon is a common remedy for aborting a cold, relieving painful menstruation and other purposes. *See* Counter-irritant.

MYASTHENIA. As myasthenia is simply another name for muscle-weakness it might be applied to such weakness, whatever its cause, but the term is usually meant to imply a disease characterised by progressive weakness in muscles all over the body, the full name of which is myasthenia gravis. This disease usually begins in the earlier years of adult life and the muscles of the face and eyes are generally the first affected; then there is an extension to trunk and limbs. The cause of myasthenia gravis is not known and treatment is unsatisfactory.

MYCOSIS. The literal meaning of the term mycosis is infection of the body with some form of fungus (q.v.). The disease which is most frequently referred to as mycosis, however, namely mycosis fungoides, is not caused by a fungus. It is a skin disease in which, after a first stage in which lesions resembling eczema occur, there is a second stage characterised by the appearance of tumours in the skin.

In the sense of being an infection with a fungus there are various mycoses which may occur on the skin or mucous surfaces of the body, or even in its deeper tissues and its organs, including ringworm and other skin diseases, thrush, actinomycosis and other disorders which are dealt with under separate headings.

MYELITIS. Certain inflammations and softening of the spinal cord are described as myelitis. Such changes may occur in connexion with an infectious fever, in syphilis, from the action of other poisons, probably bacterial, and from pressure on the cord through disease of the vertebrae or by tumours or thickenings within the spinal canal. Syphilis is the commonest cause. The symptoms will depend on the level at which the disease occurs, but when it is in the dorsal region, as most often happens, there is paralysis and wasting of the legs with loss of sensation and paralysis of the bladder and rectum.

Extension of the spine when caries exists, or operation when a tumour or other mass can be removed, may be very beneficial, and also antisyphilitic treatment, should the existence of this disease be established. Otherwise, the most that can be done is to keep the patient at rest and take precautions against the formation of a bed sore (q.v.) and infection of the bladder. *See* Paraplegia ; Poliomyelitis ; Spinal Cord.

MYELOMA. A tumour growing from the spongy tissue of a bone, a myeloma is found in young people, the commonest sites being the upper end of the tibia and the lower end of the femur. A myeloma is usually benign. It should be removed by operation.

MYOPATHY. A progressive wasting in muscles due to some cause operating in the tissue itself is described as a myopathy or a primary dystrophy. The disease is usually hereditary. It may begin in the face, causing a constant smoothness of the brow and, from weakness of the muscles of the mouth, protrusion of the lips, the so-called tapir-mouth. In other instances there is an apparent overgrowth of certain muscles, those of the calves, of the buttocks and others, while other muscles are notably atrophied. The enlargement of the muscles concerned is due to infiltration with fat, the muscle fibres themselves being atrophied and showing signs of degeneration.

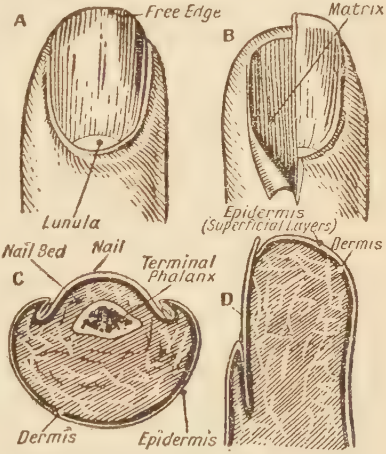
When the disease begins it may be noted that the child has an uncertain gait, and stumbles easily. Then a waddling gait is developed, and when the disease is established the child has to adopt a particular method of getting up off the ground. It gets on its hands and feet, then brings its hands back and raises itself, so to speak, by climbing up its legs. The general health should be maintained at as high a level as possible and massage and electrical treatment applied to the muscles. *See* Electricity in Medicine ; Massage ; Muscle ; Progressive Muscular Atrophy.

MYOPIA. Short-sightedness is also called myopia. It is caused by undue lengthening of the eye from behind forwards and begins in childhood. Excessive use of the eyes on very fine work and wrong postures when engaged on such work are detrimental. *See* Eye; Vision.

MYXOEDEMA. When the disease known as myxoedema has had time to develop, the appearances are quite characteristic. The skin is thickened and roughened, the features are coarsened, there is fullness of the eyelids, the complexion is sallow or muddy, except for a pink flush over the cheek-bones, the hair on the scalp and eyebrows is coarse and scanty and the hands are spade-like. Probably there are accumulations of fat above the collar-bones, in the breasts and in the abdominal wall. Speech and movements are slow and there is mental deterioration. The disease is due to faulty metabolism occasioned by failure of the activity of the thyroid gland. It is usually found in elderly persons.

The treatment for myxoedema, or for the less definite shades of thyroid inefficiency, is to administer the extract of the thyroid glands of lower animals, usually that of the sheep, beginning with small doses. The results appear to be miraculous, but the patient must continue to take the drug throughout life. *See* Endocrine; Infantilism; Thyroid Gland.

NAEVUS. Literally a birth mark (q.v.), the term naevus is generally reserved, however, for such marks when caused by an overgrowth or dilatation of blood vessels.



NAIL. A, outer view. B, showing the fold of the matrix beneath the nail. C, cross section. D, longitudinal section

NAIL. A horny structure consisting of a thickening of the middle layer of the epidermis, a nail grows on true skin, somewhat modified from that found in the skin generally, and known as the bed of the nail. The root of the nail grows from a groove in the bed, the part from which it grows being called the matrix. Just in front of the root is a whitish semilunar area, known as the lunula, and covered by a thin membrane prolonged from the adjoining skin. Sometimes this membrane is dragged forward by the growing nail, and then becomes ruffled and detached in the form of tags, a condition described as hang-nail. When the membrane extends far on to the nail, it should be pushed back.

When a nail has been struck or squeezed violently, it becomes dark purple or black. This is due to the effusion of blood beneath the nail, and it is likely that the nail will be detached from the bed. If there is severe pain, a doctor may be able to give relief by allowing the blood to escape. An ingrowing nail may occur in the foot, the nail of a great toe being most often affected. An over-tight boot is the main cause, by forcing the edge of the nail into the adjoining skin. This causes inflammation and ulceration, the unhealthy part sometimes being covered with proud flesh. A square-toed boot should be worn to give more room to the toes. The corner of the ingrowing nail should not be snipped off, as this leaves a sharp corner behind, but a little piece of cotton wool, covered with boracic acid powder, may be pressed up under the nail along the offending edge. It will be possible to push this further up each day, and thus the edge of the nail will be raised up.

The care of the nails is dealt with under the heading Hand.

NAPHTHOL. From naphthalene, a by-product of coal-tar and the substance contained in moth-balls, are prepared alpha and beta naphthol. The latter is given inwardly as an antiseptic, in doses of 3 to 10 grains, in gastric fermentation and in typhoid and other infections of the bowel. Externally it is used as an antiseptic and stimulant in scabies, eczema and other skin diseases, usually in an ointment containing 10 to 15 per cent of the drug.

NARCOTIC. A drug that produces profound unconsciousness, following a stage of excitement, is described as a narcotic. Amongst the narcotics are included opium, Indian hemp, alcohol, and the anaesthetics, chloroform and ether. *See* Hypnotic.

NASO-PHARYNX. The portion of the pharynx behind the nose is called the naso-pharynx. When one breathes through the nose this space communicates freely with the space below it and behind the mouth, but during swallowing or vigorous breathing through the mouth the communication is blocked by the ascent of the soft palate, which then becomes the floor of the naso-pharynx. The roof is formed by the base of the skull, the posterior wall by the uppermost two cervical vertebrae, and in the anterior wall are the two posterior nares, through which there is communication with the nose. In each lateral wall is the inner opening of the Eustachian tube.

There is a considerable amount of lymphoid tissue in the mucous membrane lining this cavity, particularly in the roof, posterior wall, and around the openings of the Eustachian tubes. Inflammatory overgrowths of this tissue constitute adenoids (q.v.). *See* Nose; Palate; Pharynx.

NAVEL. *See* Hernia; Umbilicus.

NECK. In the skeleton the neck is represented by a column composed of the seven cervical vertebrae, but in the clothed skeleton this column is strengthened by strong muscles, which also carry out the movements of the head. Two of these muscles, the sterno-mastoid, stand out prominently on either side of the neck, especially in muscular men. In the front of the neck from above downwards are the hyoid bone, the larynx and the trachea. In front, and on either side, of the upper part of the trachea is the thyroid gland. Behind these structures are the lower part of the pharynx, and part of the gullet, or oesophagus, and on either side of the digestive tract there is a fibrous sheath containing the carotid artery and internal jugular vein, and behind and between these the vagus nerve. From the spinal nerves emerging in the neck are formed two plexuses, the cervical and the brachial.

In the neck are several groups of lymphatic glands, and a swelling in the neck in young people is generally due to inflammation of these glands. An extensive swelling of the neck may be caused by inflammation in the loose tissue between the different layers of structures, that is to say, a cellulitis, which is likely to be associated with abscess formation.

CARE OF THE NECK. If the head is habitually carried well back, but without any strain on the muscles of the neck, these will remain firm and plastic, preserving and moulding a good contour. Here are two neck movements which can be performed sitting or standing.

(1) Tilt the chin backwards until the muscles of the throat feel taut and then bring the head back to an upright position. Repeat several times. The movement should be slow and smooth and the muscles of the mouth and chin should be relaxed.

(2) Slowly and evenly rotate the head up to the right, and, keeping it well back, down to the left and round. Do this several times before reversing the direction and keeping the head up to the left and down on the right. Avoid tension of the facial muscles by keeping the mouth slightly open. *See* Backbone; Beauty Culture; Face; Goitre: Thyroid Gland; Wry Neck.

NECROSIS. Death of a piece of bone is described as necrosis. If the piece is quite small, and there is no sepsis, it may be absorbed, but generally there is sepsis, with the production of pus which is discharged through the skin. The passage leading from the opening on the skin to the dead bone is usually narrow, and is called a sinus. Around the piece of bone granulations form, and separate it from the sound bone. The granulations soften and disappear in the pus, so that the bone becomes loose, though it may be lying in a cavity formed by sound bone. The loose piece of dead bone is called a sequestrum. So long as it persists there is likely to be a discharge from the wound. The sequestrum must therefore be removed. *See* Bone; Caries; Gangrene.

NEPHRITIS. *See* Bright's Disease.

NERVOUS BREAKDOWN. According to the popular use of the expression, a nervous breakdown may mean anything from neurasthenia or some other neurotic state to actual insanity. *See* Mental Disease; Neurosis.

NERVOUSNESS. Different characteristics are popularly described as nervousness: shyness and timidity, excitability, apprehension and the anxiety state. These qualities are more or less related, however, though individuals exhibit one or other of them more particularly. Abnormal shyness or excitability may be inborn or may result from excessive strain, worry, much excitement, mental or physical shock, the abuse of drugs or some other experience; the remedy would vary accordingly.

A nervous child should be overhauled and physical defects put right; it may be eye strain, adenoids, worms, commencing chorea or something else. When the disposition is nervous the fact that there is no discoverable cause of this kind is no reason for regarding the child as capable of living the life of ordinary children or of attempting to bully it into doing so. The natural tendency of ordinary children to tease a sensitive, diffident child and make its life a misery should be borne in mind, and any risk of the sort should be avoided in the choice of a school and otherwise. At the same time a hot-house existence is undesirable, and the child should be encouraged to exercise freely in the open air and to mix with children who are congenial to it. A child should not be forced to sleep in the dark or do anything else that terrifies it. A sense of confidence may be fostered, but it cannot be forced. *See* Hypochondriasis; Neurosis.

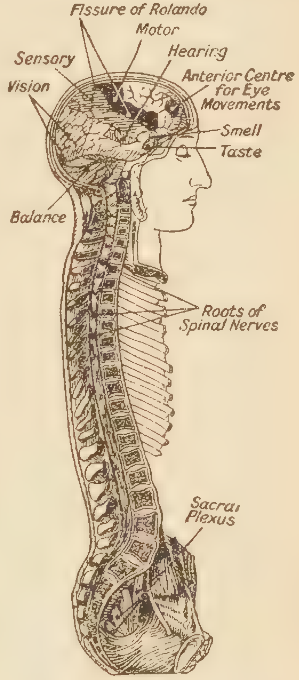
THE NERVOUS SYSTEM

System of Cells and Fibres with Amazing Powers

The following article comprises the main treatise on the nervous system, linking up all the information on this vast subject given under other headings, it also deals in general with injuries and diseases of the nerves. See Ataxia; Brain; Disseminated Sclerosis; Infantile Paralysis; Neuralgia; Neuritis; Paralysis; Sciatica; Spinal Cord · Sympathetic Nervous System

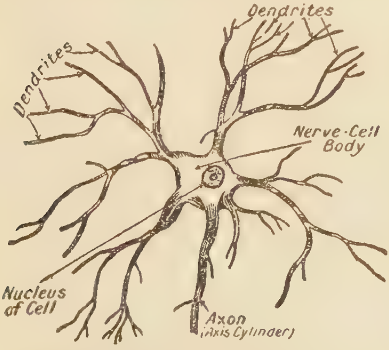
Nerve cells, with their fibres, are the units of the nervous system. These are of various shapes and sizes, but each consists of a mass of protoplasm, the body of the cell, containing a nucleus, and a long, slender prolongation outwards of its substance, known as the axon, which forms the conducting part of a nerve fibre. Most of the cells have also other processes connected with their body, relatively short and with numerous branches. These are called dendrons, or dendrites, and do not conduct impulses away from the cell, as the axon in general does, but into the cell. They may also have to do with the nutrition of the cell.

The axon is known as the axis cylinder in a nerve fibre, and is covered with a thin sheath, the primitive sheath, or neurilemma, but many of the nerves have, in addition, within this sheath, a coating of a complex fatty substance, which is known as the white or medullary sheath. Nerves with a white sheath are called medullated nerves, the others, non-medullated. When many medullated nerves are massed together in the brain or spinal cord they form what is called white matter. Grey matter, on the other hand, consists mainly of nerve cells and non-medullated fibres. In the brain and spinal cord the cells and fibres are supported by a peculiar tissue known as neuroglia.


Fissure of Rolando
Motor
Sensory
Hearing
Vision
Anterior Centre for Eye Movements
Smell
Taste
Balance
Roots of Spinal Nerves
Sacral Plexus

Metabolic changes in the body of a nerve cell can produce a current of energy along the nerve that springs from it, and this may excite movement in a muscle, activity of a gland and so on. An electric shock will also provoke a current of nerve impulse in a nerve, as will thermal, chemical or mechanical stimulation, and the impulse may go in either direction, up or down a nerve. Normally, however, the impulse will only flow in one direction. In one nerve it flows towards the nerve centres and is called an afferent nerve, in another it flows away from the cell and is called an efferent nerve. A motor nerve, that is, one activating muscle, is efferent, a sensory nerve is afferent. A peculiar effect of an impulse along an efferent nerve is not activation of anything but the reverse, inhibition or restraint of activity ; this power may be called into operation as and when required.

A nerve cell with its various processes, axon and dendron, is called a neuron, and a characteristic of the structure of the nervous system is that it is made up of relays of neurons. The brain cell with its processes is called the upper motor neuron, and the spinal cord with its processes the lower motor neuron. An impulse in the upper is communicated to the lower neuron, and thus a muscle is called into action. But, when necessary, an impulse in the upper may inhibit the activity of the lower


Dendrites
Dendrites
Nerve-Cell Body
Nucleus of Cell
Axon (Axis Cylinder)

NERVOUS SYSTEM. Nerve cell and its processes. The axon carries impulses from the cell ; and dendrites to it. Above, right, the brain and spinal cord, with their nerves, which form the central nervous system neuron, either altogether or partially. One neuron is not actually joined to another but effects a communication through its axon, at its termination, breaking up into fine tendrils, forming a sort of brush ; these tendrils surround the cell body of the second neuron or, at any rate, intertwine with its dendrons. Such an arrangement is described as a synapse.

The simplest form of nervous activity occurs in what is called reflex action. If the sole of the foot of a sleeping person is pricked the foot is drawn away, although the person may be unconscious either of the pain of the prick or of the drawing away of the foot. What happens is that an impulse is carried along an afferent nerve to motor cells in the spinal cord with which the fibres of the nerve are in communication by synapses. The cells are provoked to activity and in their turn cause a movement of the muscles to draw away the foot. This movement is co-ordinated and purposive. It is meant to withdraw the foot from what is hurting it, but it is not voluntary. Reflex actions of many kinds, such, for example, as the blinking of an eye, the movements of the intestines, the secretion of saliva and changes in the size of the pupil, are always going on more or less. In numerous instances there are chains of reflex actions, one setting another in motion.

A nerve consists of bundles, or funiculi, of nerve fibres. The whole nerve is surrounded by a sheath of connective tissue, and there is also connective tissue between the funiculi and even between the fibres. A nerve is supplied with blood vessels, with lymphatics and with nerves of its own. A nerve may be purely afferent, purely efferent or be mixed.

INJURIES AND DISEASES OF THE NERVES. If a nerve be divided, the part which is separated from the nerve cells undergoes changes. The axis cylinder and the white sheath break up and are absorbed, but the primitive sheaths of the fibres remain alive. The regeneration of the nerve is made possible by two circumstances. In the first place, new nerve fibres grow out from the divided end which is still connected with the nerve cells, and, in the second place, the survival of the primitive sheaths in the other portion of the nerve provides a scaffolding along which the new fibres may grow. Regeneration may not take place, however, if the space between the divided ends is too wide, or if they are separated by scar tissue. The activity of nerve cells may be diminished by certain drugs, bromides, for example, and can be increased by others, such as strychnine.

Inflammation in grey nervous matter is associated with dilatation of blood vessels, exudation of lymph and possibly overgrowth of the connecting substance, so that the nerve cells are damaged by compression, apart from any damage caused by the toxins which may be responsible for the inflammation. If these damaging causes are removed sufficiently early the nerve cell may recover. If it is destroyed, however, it cannot be replaced, a fact examplified in infantile paralysis (q.v.). An overgrowth of the supporting tissue in the brain or spinal cord, whether due to chronic inflammation or to degeneration of the nervous tissue proper from other causes, is called sclerosis.

A poverty of the general nutrition may weaken nervous tissue, though in prolonged starvation it is the tissue which suffers last of all. Deprivation of the blood supply, however, from blocking of the arteries causes a degenerative softening of nervous tissue. The metabolism of nerve cells may also be affected by disorders of the endocrine (q.v.) glands. The symptoms of nervous disorder depend upon the situation of the mischief and upon whether the irritability of the nerve cell is increased, lessened or destroyed, or upon whether or not the conductivity of nerve fibres is maintained.

NETTLE RASH. In the skin disorder known as urticaria, or nettle rash, there is a sudden appearance of white or pink elevations on the skin. Such elevations are termed wheals and may also be caused by insect stings or by nettles. The presence of wheals is accompanied by a sensation of violent itching, tingling or burning. Only one or two may appear, or they may affect a considerable area of skin, the commonest sites being the buttocks and the front or back of the chest. As a rule, they disappear in an hour or two, but they may last much longer and then leave some pigmentation of the skin.

Sometimes nettle rash is preceded by digestive disturbances, and in some cases there is a definite connexion between the skin manifestations and the ingestion of fish, strawberries, or less frequently eggs, meat of some particular kind or some cereal food. If, therefore, nettle rash is chronic, a search should be made for some food to which the patient is sensitised.

When nettle rash occurs, if the patient knows that he has taken something which has been responsible for a previous attack, it will be worth while to empty the stomach by giving an emetic. In any case, the bowels should be cleansed by giving a dose of castor oil or salts. A dusting powder containing zinc oxide, or a weak lotion of vinegar, warmed, may be used.

One of the varieties of the so-called gum-rash which affects young children is known as lichen urticatus, strophulus, and by other names. The trunk and limbs, especially the legs, are the chief sites of the eruption. Little pimples about the size of a pin's head make their appearance, each being surrounded by a zone of reddened skin. In the centre of the pimples there may be a little blister, which ultimately forms a crust. The diet must be scrutinised and anything obviously unsuitable eliminated. The regularity of the bowels should be maintained, say with liquid magnesia. The affected parts may be sponged with a lotion consisting of two parts of warm water and one part of vinegar. A paste consisting of equal parts of zinc oxide, talc, soft paraffin and lanolin may be applied. *See* Lichen ; Prickly Heat.

NEURALGIA. Paroxysmal pains of a stabbing, darting or burning character, occurring along the course of a nerve are described as neuralgia. The pain gradually becomes worse during a paroxysm until it reaches its acme, when as a rule it fades away, but sometimes intolerable pain may last for a long time. A sensation of tingling or numbness may precede the pain, and sometimes redness or other changes in the skin over the affected nerve accompanies it. There are tender spots, usually where the nerve becomes superficial.

Anaemia or the presence of poisons in the blood, as in the infectious fevers, malaria, gout, rheumatism or diabetes, creates a liability to neuralgia, but often there is a local source of irritation. Carious teeth, eye trouble or disease in the throat, nose or ears, for example, may provoke neuralgia in some branch of the fifth cranial nerve. In some instances an hereditary predisposition is an important factor in causing neuralgia. It should be borne also in mind that pain of a neuralgic character may occur in inflammation of the nerves or nerve roots.

The immediate treatment of neuralgia consists in applying hot or cold applications and if necessary giving aspirin, phenacetin or some similar drug. Counter-irritation by a mustard plaster, a blister or some other means may be tried, but the application should not be made over the painful part but at some little distance from it. A search must be made, however, for any constitutional or local cause. Electrical methods, ultra-violet rays and hot-air baths are used in treatment, and sometimes ionisation is successful when other methods have failed. *See* Gasserian Ganglion ; Neuritis ; Tic Douloureux ; Toothache.

NEURASTHENIA. The significant thing in neurasthenia is the poverty of mental and physical vigour, an incapacity for effort. Headache is a usual accompaniment, and takes the form of a dull pressure, which has been likened to the sensation of wearing a leaden cap. Sleeplessness is common. Digestion is sometimes poor, and there may be a tendency to palpitation.

Symptoms such as these may occur after an acute illness, notably influenza, but they also occur independently of any other disease, and it is then that the appellation neurasthenia is properly applicable. The cause here is sometimes said to be overwork, worry, or sexual excesses. Some persons, however, inherit but a scanty reserve of nervous energy, and in them neurasthenia may be readily induced.

It may require a careful examination to eliminate the possibility of symptoms suggestive of neurasthenia being actually due to some latent disease, such as consumption, malignant disease, or diabetes. In treatment it is necessary to build up the general health. If the disorder is severe, rest is necessary, and the best way of obtaining this may be a course of Weir-Mitchell treatment (q.v.). In mild cases, however, an agreeable occupation in some kind of creative work is preferable. *See* Auto-intoxication ; Hysteria ; Neurosis.

NEURITIS. Inflammation of a nerve, or neuritis, may be limited to one nerve, or affect several, when it is referred to as multiple neuritis. If it is a purely motor nerve there may be cramps to begin with and then weakness; actual paralysis is not common when a single nerve is damaged, but does occur, as in facial, or Bell's paralysis. There may be also marked wasting of the muscles concerned. If the nerve is purely sensory there may be pain, tenderness along the source of the nerve, tingling, numbness, and loss of the sense of touch and of temperature and pain.

Neuritis in a single nerve may be due to injury, cold, inflammation in adjoining parts, or some constitutional disorder, such as influenza, syphilis, rheumatism or gout. Multiple neuritis, which usually affects the limbs and occurs on both sides, is due to some kind of general poisoning. This may be lead, alcohol or arsenic; or it may be the poison of some infectious disorder, such as diphtheria, influenza, and so on. In other instances the cause is a poison due to some disturbance of metabolism, as in diabetes, anaemia and beri-beri.

Recovery from neuritis may take from one or two months to many, and is sometimes incomplete. The treatment must include that of the cause, but, apart from this, is much the same in any instance. Rest is very important, and unless in slight cases is best taken in bed. Hot fomentations assist resolution of the inflammation and relieve pain, though aspirin, phenacetin, or similar drugs may be required. When the acute stage has passed, massage should be begun. *See* Nervous System; Sciatica.

NEUROSIS. A nervous disorder which is unaccompanied by structural changes in the nerve tissue to account for it is termed a neurosis. The neuroses comprise the neuroses proper, the causes of which are fatigue, under-nutrition, toxaemia or something else of a physical nature, and the psycho-neuroses, in which the cause is entirely mental. The neuroses proper are neurasthenia or fatigue neurosis, anxiety neurosis and hypochondria; and the psycho-neuroses are hysteria including the conversion and the anxiety forms of this disease, and obsessional, or compulsive, neurosis. An occupational neurosis, such as writer's cramp, is akin to a psycho-neurosis.

A neurosis may be curable by physical methods, rest, tonics, massage and so on, but a psycho-neurosis can only be satisfactorily dealt with by some kind of psycho-therapy. *See* Mental Disease; Obsession: Psycho-therapy.

NIGHTMARE. In adults the kind of dream described as a nightmare is usually due to a heavy meal taken late at night, especially if indigestible foods have been included. Those who have suffered from any terrifying experiences may have such dreams, however, apart from any exciting cause. Similar causes may operate in the case of children, but in them adenoids, intestinal worms or febrile disorders are frequently found to be responsible. Children who have a neurotic ancestry are especially liable to such dreams, and in such children over-pressure at school may be sufficient to cause these alarming experiences.

NITRIC ACID. By the interaction of sodium nitrate and sulphuric acid one obtains nitric acid, which is a colourless liquid. It has a corrosive action and is employed for destroying warts and other unhealthy tissue. If taken internally it acts as a corrosive poison.

NITRITE. A salt formed with nitrous acid is called a nitrite. Nitrites cause relaxation of plain muscle fibres. Their use is followed by dilation of blood vessels, therefore, and this causes flushing of the skin, increase of sweating and in increased flow of urine. They may be useful in bronchitis associated with asthmatic effects. *See* Amyl Nitrite; Ethyl Nitrite.

NITROGLYCERIN. The action of trinitrin, or nitroglycerin, resembles that of amyl nitrite (q.v.), but is slower. It is administered by the mouth and is used to prevent angina pectoris, being more suitable for this purpose than amyl nitrite, though the latter should be chosen as the remedy during an attack Nitroglycerin is also useful when there is a tendency to migraine, and in some cases of high blood pressure.

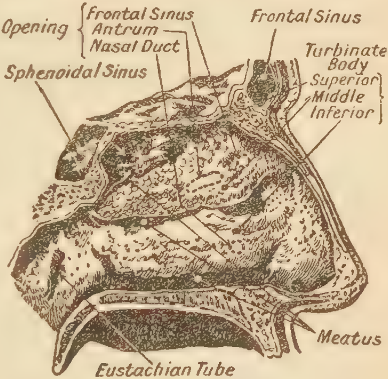
NOISES IN THE EAR. Tinnitus, or noises in the ear, may be due to many causes. Some of these are serious general diseases, or diseases of the brain in which tinnitus is unimportant as compared with the other symptoms. Some drugs, such as quinine, ergot, and sodium salicylate, cause tinnitus, but it ceases as the effects of the drugs wear off. When associated with deafness, tinnitus may be due to wax, eczema or a polypus in the external passage of the ear, or to mischief in the middle or internal ear. The noise may be hissing, ringing, blowing, or some other. The treatment of tinnitus, when any is called for, depends on the cause. *See* Deafness; Ear; Hearing.

NORMAL SALINE SOLUTION. Normal saline solution is a solution of common salt in distilled water, of a strength of 0.9 per cent. It is called normal saline because the percentage of salt resembles that of the crystalloids in the blood plasma. In other words normal saline is isotonic.

An isotonic solution is desirable when liquid is being injected into the blood stream. An isotonic solution is less irritating to the body cells, and this is the reason, for example, of normal saline being a more comfortable solution for the eyes than plain water. A sufficient approximation is got by dissolving 80 grains of common salt in a pint of boiled water. *See* Transfusion.

NOSE. The protuberance of the nose forms but a small part of the organ. The nose consists of a cavity, opening in front and behind, for the inspiration of air, the upper part of the cavity also being adapted to subserve the sense of smell. From front to back the cavity is divided into two by the nasal septum. The protuberance of the nose has a framework of cartilage, except at the bridge, which is formed by the two little nasal bones. The cavity in each side of the septum in this part of the nose is called the vestibule. Beyond the vestibule is the nasal fossa, the cavity proper of the nose. Its inner wall is formed by the septum, which is made up of the plough-share, or vomer, bone behind, the central plate of the ethmoid bone above, and elsewhere by plates of cartilage. The floor of the cavity is formed by the hard palate, and the topmost part of its roof by the cribriform plate of the ethmoid, a thin sheet of bone containing many perforations. The outer wall has three shelves, running from before backwards and curling downwards into the fossa.

These shelves, known as the turbinated bodies, are covered with mucous membrane, beneath which is erectile tissue, that is, tissue which can become engorged with blood. When the external air is cold, this engorgement takes place, so that the air is rendered warmer before it passes on into the air-tubes. The turbinated bodies project inwards almost as far as the septum, and thus make a sort of division of the cavity into four passages, the three of these lying beneath the bodies being described as the superior, the middle and the inferior meatus of the nose. In the middle meatus are found the openings of certain important cavities, namely, the antrum (q.v.) of Highmore, the frontal sinus and some of the ethmoidal cells. In the inferior meatus is the opening of the nasal duct through which tears are drained from the lachrymal sac.



NOSE. Lateral wall of left cavity showing turbinated processes and sinus openings

The lining of the upper part of the nasal fossa contains a large number of special cells, known as the olfactory cells. At the end projecting into the cavity, such a cell is stimulated by odoriferous substances in the air inhaled into the nose, while the inner end is prolonged into a nerve which passes on into the olfactory bulb, which lies on the top of the cribriform plate. Thence fibres pass back to the parts of the brain concerned with the sense of smell.

INJURIES AND DISEASES OF THE NOSE. A blow on the nose may cause a fracture (q.v.) of the nasal bones or septum, and perhaps subsequent deformity and nasal obstruction. The skin over the nose may be the site of common acne, acne rosacea, lupus vulgaris, lupus erythematosus, or some other eruption. Bleeding from the nose, or epistaxis, is discussed under the heading Bleeding. A foreign body is sometimes introduced into the nose. If it can be expelled by blowing the nose or by sneezing, good and well, but if not its removal should be left to a doctor.

Acute inflammation of the lining of the nose, otherwise acute rhinitis, or acute nasal catarrh, is what occurs in a common cold (q.v.). In some cases of acute rhinitis the discharge is purulent. This may happen, for example, during one of the infectious fevers, or should gonorrhoeal infection reach the nose.

Chronic rhinitis may be either of the hypertrophic or the atrophic variety. Hypertrophic rhinitis may follow a repetition of acute attacks. It may also occur in persons much exposed to irritating vapours or sudden changes of temperature. Changes occur in the turbinated body so that it ceases to contract properly to normal dimensions, and the passage of air is obstructed. Atrophic rhinitis is also known as ozoena, a name derived from a Greek word meaning a stench, because crusts form in the nose, and, decomposing, emit an extremely foul odour.

The treatment of acute catarrhal rhinitis is discussed under the heading of Cold, Common. Before suppurative rhinitis can be treated it is necessary to determine the precise cause. When chronic rhinitis occurs, it will generally be necessary to improve the general health of the patient by a sufficiency of open-air exercise, proper ventilation of the bed-room, a sufficiency of good mixed food, and, possibly, by giving tonics.

The nose should be cleansed once or twice a day, and lotions for this purpose can be used as a spray or a douche. A simple and effective one can be made by dissolving in a glass of warm water a teaspoonful of a powder consisting of equal parts of common salt, borax, sodium bicarbonate and white sugar, or a teaspoonful each of common salt and sodium bicarbonate. When there is foetor, a solution of potassium permanganate, sufficient of the latter to colour the solution deep red, is desirable. In ozoena, a pint of this should be injected through the nose by means of a Higginson's syringe three times a day (Plate 44).

A nasal polypus denotes disease of the bone underlying its site. These growths are usually multiple, and come from the outer wall. They cause more or less obstruction and discharge, with loss of smell and impaired hearing, and should be removed.

Tuberculosis may occur in the nose, usually in people who have the disease in the lungs, but in rare instances as an independent infection. More frequently lupus (q.v.) is found, and this may cause much destruction. Syphilis is responsible for the catarrhal condition in the nose referred to as snuffles, which is found in infants born suffering from the disease, and for the sinking of the bridge of the nose which appears later on. Acquired syphilis may be found in the nose in any of its three stages.

NOTIFICATION. Under the heading Infectious Disease there is a list of diseases, notification of the occurrence of which must be sent to the medical officer of health of the area. Similar notification on a prescribed form must be sent to the Chief Inspector of Factories, at the Home Office, London, when a doctor believes that a patient whom he is attending, is suffering from lead, phosphorus, arsenical, carbon bisulphide, aniline, chronic benzene, or mercurial poisoning, anthrax, toxic jaundice, epitheliomatous ulceration, or chrome ulceration, and that the affection has been contracted in a factory or workshop. Notices of birth, including a still-birth, must be sent within 36 hours after birth to the Medical Officer of Health ; this is in addition to the ordinary registration.

NOVOCAINE. Introduced as a substitute for cocaine, novocaine is a safer drug and is a good anaesthetic for short operations when used in combination with adrenalin.

NURSING: HINTS FOR THE AMATEUR

How to Care for an Invalid in the Home

Since for various reasons it is not always possible to engage a professional nurse, in cases of illness at home, it is advisable that every woman should know the rudiments of nursing. The general lines of conduct and procedure are laid down in the following article. See Bed Sore; Beverages; Diet; Fomentation; Infectious Disease; Invalid Cookery; Medicines

Good nursing consists in securing as much physical comfort as possible for the patient, in rendering prompt and efficient first aid in any emergencies that may arise, and in soothing and cheering the patient's mind. A good nurse co-operates loyally with the doctor in attendance, and can help him much in two ways. In the first place, a nurse should faithfully carry out all the instructions for treatment ; in the second place, by close and accurate observation, a nurse may furnish valuable information of what happens in the intervals of the doctor's visits.

When there is a choice of a room for the accommodation of the patient, a large one should be selected, and preferably one with an exposure to the south or south-west. Other matters may have to be considered, however, such as freedom from noise and the necessity for isolation, the requirements for which are detailed under the heading Infectious Disease. The room should be cleaned, dried and aired before the patient goes into it, and unnecessary furniture should be removed. The best preparation of the floor is to have it waxed or covered with linoleum, and provided with one or two light rugs.

The bed should be a single one, placed with its head against the wall, so that the nurse has free access to it from either side. It should not be too near the fire, nor in such a position as to be exposed to draught. An iron bedstead, 6½ ft. long, 3½ ft. wide, and 2½ ft. high, furnished with a good spring mattress, is the best kind of bed. A hair mattress may be placed over the spring mattress. Over this are placed a blanket and a sheet, cotton for preference, and, to cover the patient, a sheet, one or two blankets and a cover, cotton or linen being best. An eiderdown quilt is often useful. The bolster and pillow should not be too soft.

Often a draw-sheet will be necessary. This consists of a piece of an old cotton sheet long enough, when doubled, to reach from the back of the shoulders to the knees of the patient, and broad enough to be tucked beneath the mattress. An india-rubber sheet may have to be placed beneath the draw-sheet, or, in an emergency, clean brown paper or newspapers.

The bed should be made daily, the mattress being aired and turned. The under-sheet should not be placed over the bolster, but beneath it, and the slack brought over the bolster. The blanket and sheet should be perfectly smooth, and should be tucked under the mattress at the sides. This should be done also with the upper sheet and the blankets when the patient is in bed, but the cover should be allowed to hang at the sides.

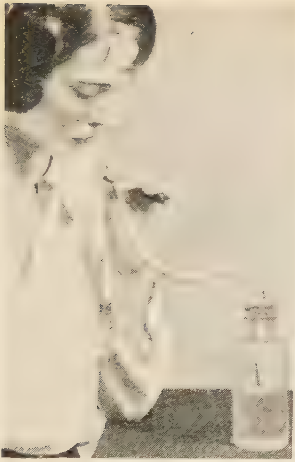
When a patient cannot be taken out of bed, the under-sheet may be changed in this way. The clean sheet is rolled up for half its width. The patient is turned on one side and supported by an assistant. The nurse then rolls up the soiled sheet till the roll is at the patient's back. Against this roll she places the roll of the clean sheet. The patient is then turned on his back, and the assistant removes the soiled sheet and unrolls the clean one (Plate 45).

Should it be necessary to change or turn over the mattress, or remove the patient to another bed, a light pole may be rolled up in either side of the under-sheet until about touching the patient's body. One or two people on each side then grasp the poles, preventing the sheet from slipping, and raise the patient up. He is then carried over the bottom of the bed and over the top of another bed or couch placed in position (Plate 46).

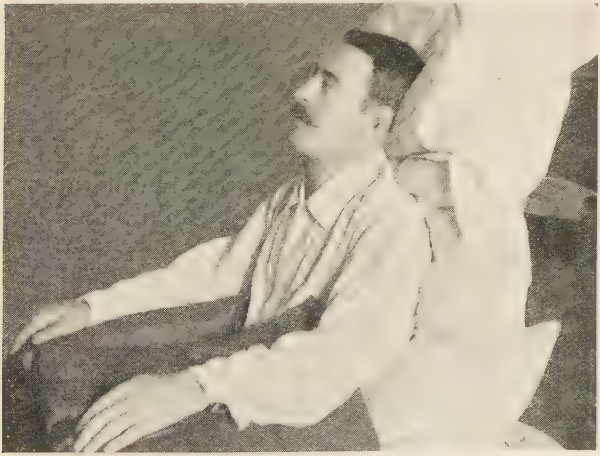
A sick-room should have a fire-place, and, even if no heating is required, it may be desirable to place a lighted lamp in the fire-place to cause an upward draught and help the ventilation of the room. The temperature of the room should not be less than 55°, and for bronchitis and other disorders may have to be about 70°. It should be kept as even as possible. When a coal fire is used, each piece of coal in the scuttle should be wrapped in a piece of paper, so that it can be noiselessly placed on the fire.

The proper inlet for fresh air is the window, and the top sash should be well pulled down to admit the air. A narrow chink causes the air to rush in with greater force and is more likely to cause a draught. Screens may be placed, when necessary, to prevent the air blowing directly on the patient, and special precautions should be taken when the patient is exposed for washing.

If practicable, the patient should be washed all over every day with warm water and soap. Only one part of the body is exposed at a time, washed and dried with a warm towel before proceeding to the next. Bedding should be protected with another towel (Plate 48). The teeth and mouth should be washed several times each day. The hair should be brushed. The best time for carrying out this full toilet is about an hour after breakfast. A feeding cup with a spout is used in feeding a helpless patient. The nurse places one arm beneath the patient's pillow and raises his head and neck on this when he is taking his meal.

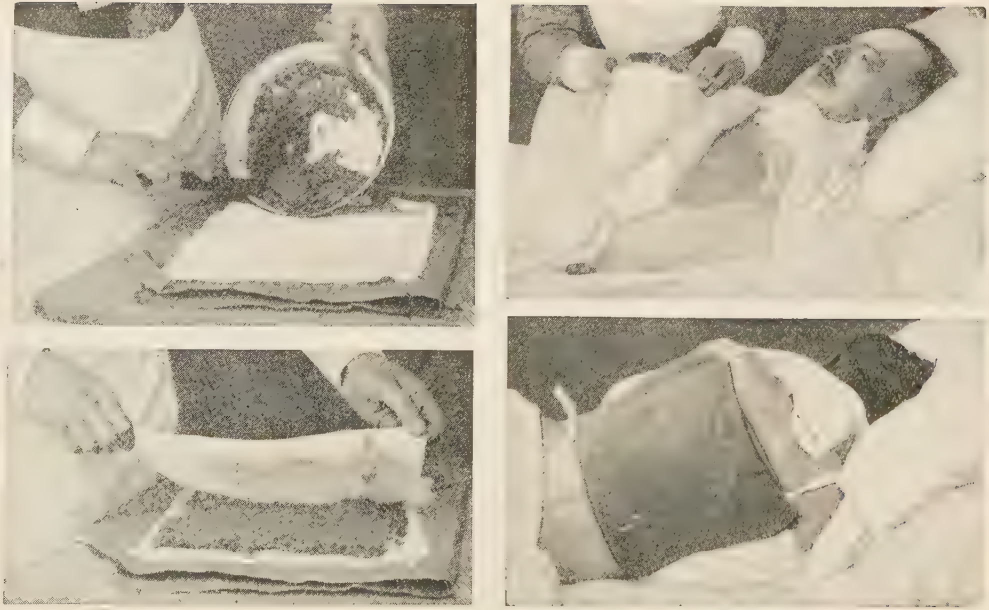


Left. Pleurisy. Expansion of a compressed lung can be assisted by blowing water out of a bottle through a rubber tube. Blowing up balloons is another aid to deep breathing and expansion of the lung. Right. Pneumonia jacket of flannel lined with cotton wool, for wearing over a poultice



Pneumonia. A pneumonia patient should not be allowed to lie flat on his back or on one side, as circulation through the lungs is thereby impeded. He should be propped up as shown above, his hands resting on cushions in order to lessen the strain on the heart

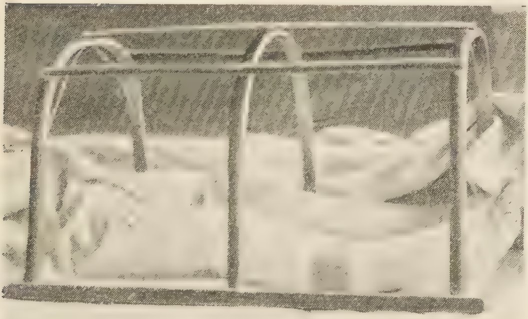
BENEFICIAL TREATMENT FOR PLEURISY AND PNEUMONIA



To make a linseed poultice, boiling water is poured into a bowl and linseed added gradually while stirring. When the mixture is such that it leaves the bowl clean, it is spread on a piece of linen (top left). A second piece of linen is placed over it and the margins pressed together (left). When applied to the chest it is covered with a piece of jaconet and a layer of cotton wool (top right). Poultice bag for the back (right)

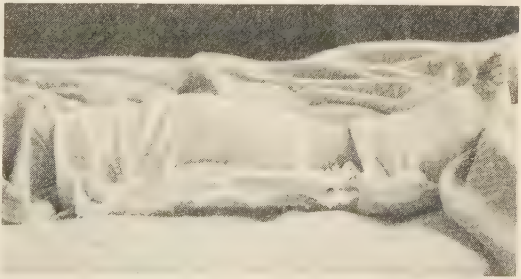
MAKING AND APPLYING A LINSEED POULTICE

Much comfort may be derived from covering painful joints with hot cotton wool which may be kept in place by a flannel bandage. The joint may be first smeared with a preparation of methyl salicylate or some other, covered over with gutta-percha tissue or oiled silk

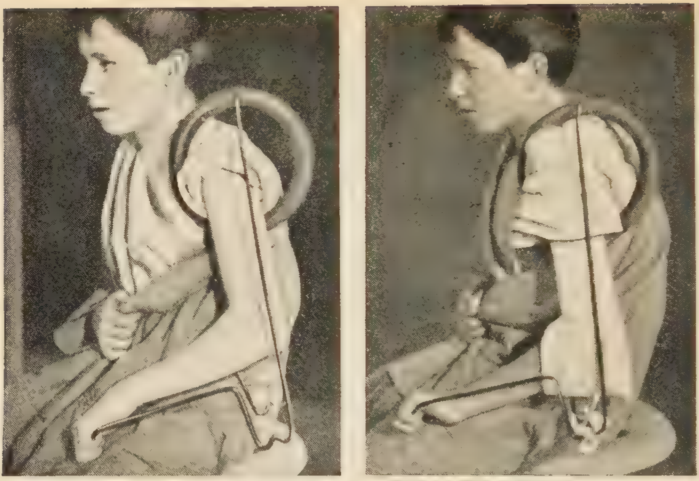


When joints are acutely tender the presence of bed-clothes may become unbearable, and resort should then be had to a bed cradle. That shown in the photograph is constructed of cane, and is light and otherwise efficient. Care must be shown when placing it in position

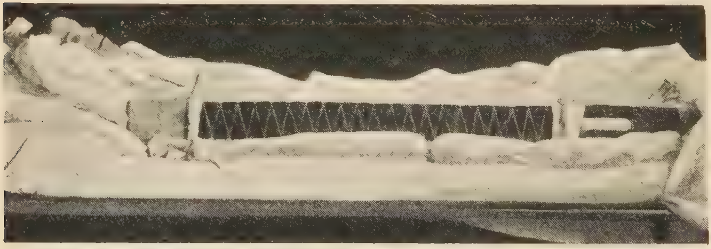
When a patient is restless it will sometimes be necessary to immobolize a joint by placing the limb on a splint. This may secure a sufficient period of uninterrupted sleep. The splint must extend well above and below the joint, and be comfortably padded



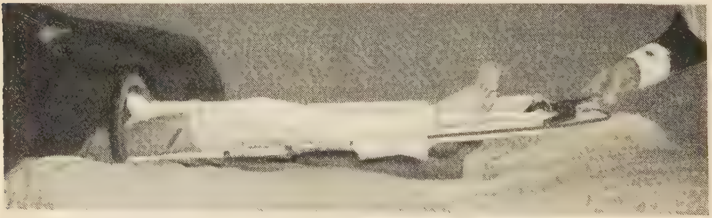
RHEUMATIC FEVER : THE TREATMENT OF JOINTS



Left. Thomas's Splint for the arm. The ring fits round the shoulder and the splint is bent at right angles at the elbow. Right. By means of plaster affixed to the arm, extension can be applied, the splint at the elbow being adapted for attaching the apparatus by which extension is made



Long splint, reaching from the armpit to beyond the foot, to keep the limb at rest in sciatica



Thomas's Splint applied for fracture of the femur, the site being indicated by a mark. The limb is supported on slings made from pieces of broad bandage, and extension is applied by a rubber elastic tube

SPLINTS FOR THE ARMS AND THE LEGS

When a patient is suffering from fever, a chart should be kept for noting the temperature at such times as it is taken. On this chart are also noted the pulse rate, sometimes also the respiration rate and the number of times the bowels move. In any case of illness it may be desirable to keep a record of the food and medicine given, the amount of sleep and other relevant facts.

A water-bed may have to be used. This consists of a large rubber bag, 3 ft. across and 2, 4, or 6 ft. long. It has a nozzle at one corner. The patient should not be lying on a water-bed when it is being filled. For filling, the upper end of the bed should be raised by blocks placed beneath the legs. Water at a temperature of 90° F. is then poured in through the nozzle, using a filler. Enough water should be run in to prevent the sides of the bag meeting when firm pressure is made. An over-filled water-bed is very uncomfortable. Sometimes air cushions are used to take the pressure off tender parts.

NUX VOMICA. The dried seed of an Eastern plant, nux vomica contains, and owes its properties to, the alkaloids strychnine and brucine, more especially the former. Both alkaloids are bitter, and nux vomica is a most useful digestive tonic both on this account and because it increases at the same time the tone of the muscles of the digestive tract. Strychnine increases the rapidity and extent of the respiratory movements, and may be of service sometimes in bronchitis and other respiratory troubles. Another effect of this drug is to sharpen the special senses. The action of brucine is somewhat similar to that of strychnine, but it is less poisonous.

POISONING BY NUX VOMICA. Nux vomica is a very powerful drug, and excessive doses may have dangerous and often fatal consequences. Effects of over-dosage may occur when the drug has been taken in ordinary doses, but for some length of time, say, in Easton's syrup. There is general excitability.

Poisonous doses cause convulsions rather like those of tetanus, except that they do not begin as lockjaw, nor are they constantly maintained, as in this disease. Symptoms may appear very quickly after taking the dose. The stomach should be emptied by an emetic of mustard and water, and then strong tea given freely. A doctor should be summoned at once, being informed of the nature, or suspected nature, of the poisoning.

NYCTALOPIA. A lessened ability to see in a dim light is called night-blindness, or nyctalopia, though some writers use this term for the opposite condition, namely, lessened ability to see in a bright light, which is more properly described as day-blindness, or hemeralopia. Night-blindness occurs most frequently in those suffering from the eye disorder known as retinitis pigmentosa, but may also occur from quinine poisoning, or follow much exposure to a bright light. Where improvement is possible, it may be obtained by keeping the eyes covered for a length of time and giving general tonics.

NYSTAGMUS. Involuntary oscillations of the eyes are described as nystagmus. It arises from difficulty in fixing the eyes on an object; this difficulty may be created by congenital cataract, inflammatory diseases, which leave obscurity of vision, or the condition of albinism. In later life nystagmus may arise from ear disease. It may be an occupational complaint, the commonest example being miner's nystagmus. *See* Eye.

OBESITY. An excessive development of adipose or fatty tissue throughout the body is called obesity. A tendency to obesity may be noted in some families, and in a considerable proportion of all individuals who have passed middle life. In certain cases obesity is due to lack of activity of glands of internal secretion, notably the thyroid, pituitary, and sex glands.

Fat in the body is derived mainly from carbohydrate foods, but may be formed from fats or proteins. Obesity may result, therefore, from consumption of an excessive amount of food, particularly of carbohydrates, especially when an insufficient amount of open-air exercise is taken. Over-indulgence in malt liquors is a notorious cause of obesity.

An obese person tends to be short of breath on slight exertion. The interference with the contractile power of the heart is mainly responsible, and this organ may become dilated and very feeble. The bowels are sluggish, the liver is much enlarged and is also sluggish, and therefore the digestion may be poor and there is a special tendency to the formation of gall-stones.

The treatment of obesity due to definite defects of internal secretions may be most successful when it consists in giving extracts of the gland at fault, but this should only be done under medical supervision. Ordinarily the treatment of obesity consists of a controlled diet and more exercise. Slimming exercises for persons tending to obesity are described and illustrated under the heading Figure. The changes required in the diet are to cut down the carbohydrates, that is, sugars and starches, to a minimum, to eschew very fat flesh foods and to restrict the total amount of food. Under the headings Diet and Food guidance is provided for framing suitable diets. Sufficient liquid may be taken to relieve thirst, but no malt liquor or sweetened drinks. When exercise cannot well be taken, it may be replaced at first by massage or by the use of the Bergonié chair, in which muscles all over the body are made to contract against a weight. After such preliminary treatment ordinary gentle exercise will probably become possible. *See* Abdominal Exercises; Banting; Constipation; Diet; Exercise; Figure; Food; Thyroid Gland.

OBSTRUCTION. Any tubular structure in the body may become the seat of obstruction, but when this term is used without qualification what is meant is obstruction of the bowel. This may occur suddenly, sometimes when a person is making a strong exertion. Severe pain of a colicky nature is felt about the navel and is accompanied by more or less collapse. Vomiting begins and keeps recurring at intervals. The vomited matter sooner or later acquires a faeculent character. This acute obstruction may be due to strangulation of a hernia, the pressure of bands or adhesions on the bowel, volvulus or twisting of a loop of gut, intussusception (q.v.), impaction of faeces or of some foreign body in the gut, or acute kinking. Sometimes the person has been suffering from chronic obstruction. Acute obstruction demands immediate operation. On no account should purgatives be given without a doctor's advice.

Chronic obstruction is characterised by increasing constipation with bouts of diarrhoea, caused by irritation due to stagnant bowel contents. The belly tends to be distended constantly. From time to time there are attacks of colic. Vomiting may occur at the same time. Chronic obstruction may be caused by impaction of faeces, scarring of the bowel, the growth of a tumour in the bowel and other disorders. Here also medical advice should be got without delay. *See* Colic; Constipation; Hernia; Intestine; Intussusception.

OCULO-MOTOR NERVE. The 3rd cranial or oculo-motor nerve supplies most of the muscles that move the eyeball, the fibres in the iris that contract the pupil, the ciliary muscle which produces accommodation (q.v.) for near vision, and the muscle that raises the upper eyelid. *See* Eye.

OESOPHAGUS. *See* Gullet.

OIL. The oils are divided into two main groups. The first consists of the fixed oils, that is, oils which do not volatilise. Amongst those used in medicine are almond oil, castor oil, cod-liver oil and olive oil. Most fixed oils are emollient and nutritive but castor oil and croton oil are purgative, and the latter is very irritating to body tissues.

The second group is that of the essential or volatile oils. These are aromatic substances and are not greasy. Many oils of this kind are used in medicine, including oil of peppermint, oil of lemon, oil of citronella, oil of cloves and so on. Essential oils act as carminatives and antispasmodics. In large doses they stimulate at first, but later cause depression. They are powerfully antiseptic, and have a stimulating effect on skin and mucous membranes, causing redness.

OIL OF VITRIOL. *See* Sulphuric Acid.

OINTMENT. The basis of an ointment usually consists of benzoated lard or soft paraffin, but may contain lanolin, beeswax, spermaceti or oil. With the basis are incorporated liquid or solid drugs. An ointment is intended for external application and, unless it contains some stimulating drug, it exerts an emollient action on inflamed surfaces.

The drug incorporated may increase this soothing action, as, for example, in the case of the zinc and the lead ointments. Drugs mixed with fats may be absorbed through the skin, however, and an ointment may have a sedative effect. Others are antiseptic, astringent, stimulating and alterative. *See* Inunction.

OLFACTORY NERVE. The first pair of cranial nerves are called the olfactory nerves. They are concerned with the sense of smell and begin as specialised olfactory cells in the lining of the upper part of the nose (q.v.).

OLIVE OIL. The pale greenish-yellow oil expressed from ripe olives has a considerable place in the dietary, especially in some countries. It has also medicinal uses. In doses of 2 drachms to 1 ounce it has a laxative action. It is also soothing to the lining of the digestive tract, and may be given freely by the mouth in irritant poisoning, except when oils are barred. Large quantities may be injected into the bowel for colitis or to relieve stubborn constipation. Large doses of olive oil are sometimes given to people suffering from gall-stones in the hope that it will dissolve these out. Olive oil has an emollient action on the skin. Mixed with lime-water it forms Carron oil.

OPHTHALMIA. *See* Conjunctivitis.

OPIUM. The juice of a poppy, which has been rendered solid by evaporation of most of the water, opium contains a large number of alkaloids, including morphine and codeine. Though the main action of the drug is sedative and depressant to muscular activity, some of the alkaloids are capable of causing convulsions when given alone. Opium procures sleep, but the onset of somnolence may be preceded by a certain amount of excitement, and in some persons moderate doses may cause prolonged excitement and actually prevent sleep. Opium is also one of the most powerful remedies for relieving pain. It is a common ingredient of cough mixtures, as it prevents an irritating cough, but its use is dangerous when coughing is required to clear phlegm from the bronchial tubes. All the secretions of the body, except the sweat, are diminished or dried up by opium. The drug is often, therefore, of use in checking diarrhoea.

There are many preparations of opium and others containing it or its alkaloids. Tincture of opium is better known as laudanum, and the compound tincture of camphor as paregoric. There are three salts of morphine, the acetate, the hydrochloride and the tartrate. Of preparations for external use there are the liniment and the ointment of gall and opium, which is a remedy for piles. Some soothing syrups have been found to contain opium, and deaths have occurred from their use, as opium in any shape is very badly borne by young children. It should never be given to them except under medical supervision.

POISONING BY OPIUM. Poisonous doses of opium cause no noticeable preliminary excitement but a drowsiness which deepens into profound sleep, from which, however, the patient may be roused, and then into coma, when it becomes impossible to rouse him. The skin is pale, cold and perhaps covered with perspiration The breathing becomes slow, then irregular and shallow. The pupils contract until hardly visible.

The patient must be aroused, if possible, and given an emetic of mustard and water. The best antidote is permanganate of potassium, and sufficient of this should be dissolved in half a glass of water to make a deep red solution, which the patient should drink. Then hot strong coffee should be given freely, and, if the patient is unconscious, half a pint of coffee should be injected into the bowel ; this may be repeated once or twice. The patient must be kept awake, if necessary by walking up and down. If breathing is weak, artificial respiration should be carried out.

The victim of the opium habit or morphinism loses his appetite and powers of digestion, and as a rule his moral sense is progressively sapped until he becomes a liar and probably a thief. Sometimes he loses his reason. The condition is best treated by isolation in an institution. *See* Drug Habits ; Poisoning.

OPTIC NERVE. The second pair of cranial nerves are called the optic nerve and subserve the function of vision. The fibres of an optic nerve are spread out all over the retina of the eye and are gathered up into a rounded bundle which passes back through an opening in the back of the eye to the brain. *See* Eye.

ORCHITIS. Inflammation of the testicle is called orchitis. Should the back portion of the organ be first affected, however, the condition is called epididymitis. *See* Testicle.

ORIENTAL SORE. In certain localities on the Mediterranean shores and further east there occurs a chronic ulcerative disease which is known as Oriental sore and by other names, according to places in which it is found. It is caused by infection with a minute protozoal parasite, leishmania tropica. This can be conveyed by contact, but insects would appear to play some part in dissemination. The disease is usually successfully treated by intravenous injections of antimony. The sores are dressed with antiseptics. *See* Leishmaniasis.

OSSIFICATION. The formation of bone is called ossification. In the skeleton, as it first exists, the bones are represented by cartilage, or gristle, with the exception of a few in the skull, which are represented by membrane. When the embryo is a few weeks old, however, bony tissue begins to be laid down at various points in the bones, such points being called centres of ossification. It is not till after the age of twenty that all the cartilage has been converted into bone. *See* Bone ; Epiphysis.

OSTEITIS. Inflammation of bone is called osteitis. The commonest cause is tuberculosis, but it may be caused by trauma, syphilis, the organisms of some of the infective fevers or septic organisms of low virulence. The treatment depends on the cause. Osteitis deformans, also known as Paget's disease, is a chronic inflammatory bone disease affecting the long bones and those of the brain pan. The bones become thickened and the long bones lengthen. At the same time they become softer. There may be neuralgic pains, but otherwise the health is unaffected, though the disease goes on progressively. Aspirin and similar drugs may be used to relieve the pain, but otherwise nothing can be done as the cause of the disease is not known. *See* Bone ; Osteomyelitis ; Periosteum.

OSTEO-ARTHRITIS. Middle-aged and elderly people may suffer from progressive changes, described as osteo-arthritis, in the bones and cartilages of joints. The cartilage softens and is rubbed off, the exposed end of the bone becomes smooth and polished, but at the margin of the joint surface, on the other hand, the bone shows overgrowth, either in the form of general accentuation of its edge, that is to say, lipping, or in the forming of localised projections, or osteophytes.

The joints most frequently affected are the hip, the knee and the shoulder. Fairly frequent also are enlargements on the back of the last joint of the fingers, known as Heberden's nodes. Since the joints mentioned are those exposed to most strain on the whole, this may be a factor in causation. It is thought, however, that toxaemia may also play a part. At the outset pain may be slight and intermittent, but later may become more severe and be continuous. There is also a limitation of movement.

In treatment the general state of health must be considered. The bowels must be kept freely open. Any possible source of toxaemia should be cleared up as far as possible. Moderate exercise is desirable, though rest may be necessary if the symptoms are acute. The general and local treatment for rheumatism (q.v.) may be useful in relieving pain. Sometimes prolonged treatment at a spa will appear to be the wisest course to take. *See* Joint ; Rheumatoid Arthritis.

OSTEOMALACIA. A disease of bone, characterised by softening of its structure, osteomalacia is almost always limited to women and generally begins during pregnancy or the nursing period. A large proportion of those affected manifest the spasmodic nervous disorder known as tetany (q.v.). Little is known about the causation of the disease, but unhygienic surroundings, including a lack of sunshine, appear to be factors. Cod-liver oil and calcium phosphate have proved capable of doing some good, as has treatment by glandular extracts.

OSTEOMYELITIS. The literal meaning of the word osteomyelitis is inflammation of the bone marrow. It generally occurs in children, the lower end of the femur or the upper end of the tibia being very common sites. The immediate cause is the activity of a microbe, usually a staphylococcus, but often there has been some injury. The child complains of pain above or below a joint and soon looks very ill, with a high temperature and probably delirium. There is swelling and tenderness over the affected part. The condition is often mistaken for acute rheumatism, though it ought to be distinguished easily from this disease by the fact that the mischief is not in the joint. Unless immediate surgical treatment is undertaken the child may die in a day or two from septicaemia (q.v.). *See* Femur ; Osteitis.

OVARY. Under the heading Genital System an account is given of the position, relations and functions of the ovary and of the causes and symptoms of inflammation of this organ. Displacement of the ovary may occur, and, from congestion of the organ, there is great tenderness and pain during intercourse, and in some cases when the bowels move or when walking. The cause of the displacement may have to be dealt with by operation. Tumours of the ovary are generally cystic, and if allowed to do so they may grow to huge dimensions. Ovarian growths should be removed as early as possible.

The removal of one ovary makes no difference, as the other functions for both, but if both ovaries are taken away there results an artificial menopause.

OXALIC ACID. In the form of calcium oxalate, oxalic acid is a normal constituent of urine. Its source is mainly food, as tea, rhubarb, tomatoes, gooseberries and other things contain a certain amount, but some of what is excreted is formed within the body. In certain circumstances the calcium oxalate is deposited as crystals in the urine, an occurrence described as oxaluria. The treatment is to correct any dyspepsia and avoid foods containing the acid, and also to limit milk because it is rich in calcium. Meat, bread, butter, milk puddings and coffee should be the main items of diet. Magnesia and citrate of potash are used to keep the oxalic acid in solution.

POISONING BY OXALIC ACID. Oxalic acid is used in the household as a cleansing agent, and accidental poisoning may occur. Oxalic acid is a corrosive poison, destroying tissues with which it comes into contact. It causes burning pain in the mouth, throat and stomach, vomiting and collapse. An emetic must on no account be given. The best antidote is lime, such as powdered wall plaster, chalk or whiting, mixed with a little water. Neither sodium nor potassium carbonate should be used, as they form soluble oxalates with the acid, and these pass into the circulation and poison the heart. For the same reason as little water as possible should be given. *See* Poisoning.

OXYGEN. A colourless, odourless and tasteless elemental gas, oxygen constitutes about one-fifth of the bulk of the atmosphere, in which it is mixed with other gases, but mainly nitrogen. Water consists of a chemical combination of oxygen and hydrogen. Animal and vegetable life would be impossible but for the presence of oxygen in the air, or, as regards aquatic animals and plants, dissolved in water.

Pure oxygen, compressed in steel cylinders, is supplied for inhalation in appropriate circumstances, more particularly to prevent or remove asphyxia. Thus, inhalation may be beneficial in pneumonia and in heart disease with lung complications. Oxygen is often useful in carbon monoxide poisoning, and in acute uraemic poisoning.

OZOENA. *See* Nose.

PAGET'S DISEASE. Two separate disorders are described as Paget's disease. The first is osteitis deformans, a disease of bones, which is discussed under the heading Osteitis, and the other is Paget's disease of the nipple. *See* Breast.

PAIN. Pain has not always the same quality, but in various instances may be described as boring, gnawing, cutting, stabbing, crushing, burning, throbbing and so on. The special quality may give some hint of the cause of the pain, a throbbing pain being often associated with suppuration, for example. The situation is usually of more significance, however, as a clue to the cause. There are instances, nevertheless, when the situation of the pain may give a misleading idea of the cause, unless the distribution of nerves is borne in mind. A pain in the temple, for example, may be caused by a carious tooth. This is known as referred pain, and visceral pain is of this nature. Irritation in the liver, for instance, may cause a pain at the back of the shoulder. The explanation of this is that sympathetic nerve fibres from the liver pass into the spinal cord in the posterior root of the nerve supplying the skin over the back of the shoulder, and in the root the impulse travelling up the former is transferred in some way to the fibres of the latter and carried to the brain, where it is interpreted as coming from the endings of the sensory nerve at the back of the shoulder.

A remedy that relieves pain is described as an anodyne or analgesic. *See* Inflammation ; Neuralgia ; Neuritis ; Sensation ; Spinal Cord ; Sympathetic Nervous System.

PALATE. The rigid arch which forms the roof of the mouth and the floor of the nose is called the hard palate. The front, and larger, part of it consists of portions of the upper jaw bones ; that at the back, of the horizontal plate of the palate bones. The palatal arch may be higher than usual in certain people. It is one of the so-called stigmata of mental degeneracy, but it may be caused by adenoids in early childhood. From failure of the bones to come together during development a cleft palate (q.v.) may exist at birth.

The fleshy curtain hanging downwards from the posterior border of the hard palate is called the soft palate. In the middle line it is prolonged into a narrow projection, the uvula. During swallowing or deep mouth-breathing the soft palate is drawn up so as to shut off the naso-pharynx (q.v.). Sometimes the uvula is unduly long, when it tends to tickle the back of the throat and cause cough and, perhaps, nausea. The application of astringents may improve matters, but it is often necessary to have a part of the structure snipped off. *See* Cleft Palate ; Mouth.

PALLOR. In some healthy people there is pallor or paleness of the face, while the mucous membranes, for example, the lining of the lower eyelid and the gum, retain a good colour. Should these parts, however, also be pallid some departure from the ordinary is indicated. A sudden pallor may occur from faintness or fright, and is then due to contraction of blood vessels, but when it is constant pallor is indicative of anaemia (q.v.)

PANCREAS. One of the most important organs in the body, the pancreas, is an elongated gland which is described as having a head, a neck, a body and a tail. The head is tucked into the loop formed by the duodenum, while the body stretches across the abdomen in front of the aorta and behind the stomach, so that the tail comes into contact with the spleen. (*See* illustration on page 8.) The larger part of the glandular tissue is concerned in manufacturing the pancreatic juice, the uses of which are described under the heading Digestion. Scattered throughout the pancreatic substance are little collections of cells, known as the islets of Langerhans, the function of which is to produce the internal secretion known as insulin, which accelerates the burning up of sugar in the body.

DISEASES OF THE PANCREAS. Inflammation of the pancreas, similar to that occurring in the parotid and other glands, may occur in mumps (q.v.). In acute haemorrhagic pancreatitis, which usually occurs in adult males, there is free bleeding into the pancreas. There is severe colicky pain in the upper abdomen, vomiting and collapse. The abdomen is swollen and tense, and there is constipation. This disorder is generally fatal.

In chronic pancreatitis the glandular tissue is replaced by fibrous tissue, and consequently there is impairment in the digestive functions. One consequence is the loss of the insulin supply, and the supervention of diabetes.

Cancer, which is much the most usual new growth found in the pancreas, usually occurs in the head portion. It causes indigestion, pain in the pit of the stomach and rapid wasting. An early operation has sometimes been successful in eradicating the disease. *See* Abdomen ; Diabetes ; Digestion ; Insulin.

PARAESTHESIA. An alteration of sensation, such as tingling, burning, chilliness, numbness or formication, without any obvious cause, is described as a paraesthesia. Formication means the sensation of ants crawling over the skin. A paraesthesia may occur in various nervous diseases. *See* Sensation.

PARAFFIN. Various paraffin substances are obtained from shale by distillation, and some of them are used in medicine. Hard paraffin, or paraffin wax, is a colourless, semi-transparent, waxy-looking substance without smell or taste. Soft paraffin, also called petroleum and petroleum jelly, is white or yellow and is semi-solid. Vaseline is a proprietary brand of soft paraffin. These paraffins are used for making ointments, the official paraffin ointment being an admixture of the hard and soft varieties.

Liquid paraffin is a clear, colourless and odourless oily liquid. It is used as a basis for fluids used in atomisers and in doses of 2 to 4 drachms as a laxative, for which purpose soft paraffin may also be used. Paraffin oil, or kerosene, is used for destroying lice. *See* Ambrine ; Ointment.

PARALDEHYDE. A liquid hypnotic, paraldehyde has a disagreeable odour and taste, but is relatively safe and efficient. The average dose is 2 drachms.

PARALYSIS. Loss of power in a muscle is called paralysis. If the loss is only partial, however, the condition may be referred to as paresis. Paralysis may be due to disease or injury of the nerve cells or nerves controlling a muscle, or, less frequently, to degenerative changes in the muscle itself. Paralysis due to damaged brain cells is likely to be a stiff or spastic paralysis, and that due to damaged cord cells or nerves a limp or flaccid paralysis. When the lower limbs are affected, each of these types produces a characteristic gait (q.v.).

Disease of the cortex of the brain on one side may cause hemiplegia, that is, paralysis of one side of the body. Hemiplegia on both sides is called diplegia. Hemiplegia may also be due to damage at lower levels in the brain, but, if sufficiently far down, there may be what is called crossed hemiplegia, that is, paralysis of the face on one side of the body and of the arm and leg on the other. A limited damage to the cortex of the brain may only cause a monoplegia, that is, paralysis of an arm, a leg, or of one side of the face. Paralysis of both legs is called paraplegia, and is usually due to damage to the spinal cord by injury or disease. In many instances there is the possibility of a paralysis being functional or hysterical in character.

Treatment of paralysis has two aspects, namely, that of the cause and that of the muscles themselves. As regards the first, it may be necessary in some cases to remove by an operation a source of pressure on nervous tissue or to repair a nerve. Generally rest in bed will be required to promote a return to health of the damaged nervous tissue. When syphilis or some other infection is the cause, special treatment will be required. A paralysed muscle is liable to be stretched either from the effects of gravity or by contraction of the opposing muscles. Thus, when the muscles on the front of the leg are paralysed, the foot tends to be bent downwards at the ankle merely from its weight, and in bed the bedclothes cause or increase bending by pressure on the toes. One effect of this is to prevent recovery of power, as a stretched muscle has great difficulty in recovering. Another is that the contracted muscles tend in time to shorten. To prevent these consequences a paralysed limb is splinted, so that stretching of the paralysed muscle cannot take place. To prevent the pressure of bedclothes on a foot a bed-cradle is employed.

A paralysed limb must be kept warm by means of a thick stocking or a flannel bandage. When any acute mischief responsible for the paralysis has settled down, gentle massage is used, and as time goes on this may become more vigorous, and other means of restoring tone, such as electrical stimulation and whirlpool baths, may be added. *See* Birth Paralysis ; General Paralysis of the Insane ; Infantile Paralysis ; Nervous System.

PARAMETRITIS. Inflammation of the loose, or cellular, tissue lying on either side of the womb is called parametritis or pelvic cellulitis. Infection takes place in connexion with childbirth, as a rule. The patient must rest in bed and undergo hot douching and other treatment. *See* Perimetritis ; Womb.

PARATHYROID. Two pairs of glands, lying behind and in close relationship to the lateral lobes of the thyroid gland, are known as the parathyroid glands. They appear in some way to influence calcium metabolism in the body, and when they are removed or diseased tetany supervenes.

PARKINSON'S DISEASE. Paralysis agitans, or Parkinson's disease, is a chronic nervous disorder, which usually occurs after middle life and is more frequent in men than in women. Its onset is insidious, and its course is characterised by the development of muscular weakness, rigidity and tremors. The face has a wooden expression, described as Parkinson's mask, and the body is held stiffly. There is a peculiar gait (q.v.), which goes by the name of festination. The hands exhibit a coarse tremulous movement, as if rolling pills, and there may also be tremor of the rest of the upper limb, the head, the tongue and the legs. There is no cure, but some relief may be obtained from doses of hyoscine hydrobromide.

PAROTID GLAND. The largest of the salivary glands, the parotid lies in front of, and beneath, the ear. Its main discharge tube, known as Stensen's duct, passes forward and opens on the inner surface of the cheek, opposite the second upper molar tooth. Through this duct a thin salivary juice is poured into the mouth. Inflammation of this gland is called parotitis. Epidemic parotitis is better known as mumps (q.v.). In this disease the gland does not suppurate, but it may do so in ordinary parotitis. Sometimes an abscess forms in Stensen's duct and, bursting through the outer surface of the cheek, causes a salivary fistula. Infection in these cases comes from the mouth.

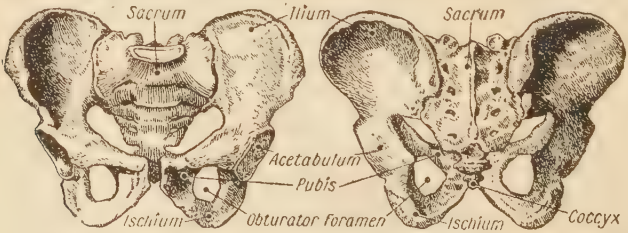
PARRISH'S SYRUP. The compound syrup of iron phosphate, B.P.C., is also called Parrish's syrup and chemical food. It is a useful tonic, especially for children, and is given in doses of ½ to 2 drachms, frequently in conjunction with cod-liver oil.

PATELLA. The small rounded disk of bone known as the patella, or knee-cap, is interposed in the tendon attaching the quadriceps extensor muscle of the front of the thigh to the upper end of the tibia. The skin over the patella is stretched when the knee is bent, and in this position a blow or fall on the bone usually causes a long wound, resembling a cut. The bone may be broken (*see* Plate 37) by a blow or by a violent attempt to straighten the leg. The first-aid treatment is discussed under the heading Fracture. *See* Bursa; Knee.

PATENT MEDICINE. A secret remedy is a patent medicine only when it has been actually patented, in which case it carries a special label. A proprietary medicine is one protected by a trade mark or trade name, whether or not it has been patented. Secret remedies are in this category, but some proprietary preparations are not secret. They may be either new drugs produced in a laboratory or skilful or elegant combinations of old and known drugs. The statement that a secret nostrum contains some superlatively valuable medicinal agent, unknown to medical science, can be discounted, as the therapeutical resources of the world in the way of drugs have been thoroughly examined and a judicious selection made by the compilers of the various pharmacopoeias. Proprietary remedies that are extensively advertised encourage self-drugging, a vicious habit when carried to excess and possibly dangerous at any time. *See* Drug.

PELLAGRA. In Italy, the Southern States of America and other countries, mainly those with a warm climate, a disease known as pellagra occurs. It is found amongst poor people whose diet largely consists of maize, and the most probable cause is a lack of protein. The disease is characterised by inflammation and ulceration of the mouth, diarrhoea, vomiting and loss of appetite, redness and subsequent thickening of the skin on the backs of the hands and forearms, muscular weakness and mental depression, perhaps leading to melancholia and dementia. The condition tends to improve during the colder part of the year, but gets worse, especially the nervous symptoms, when the weather gets warmer. Treatment consists in a generous diet and, if possible, removal to a colder climate.

PELVIS. The skeleton of the lowest part of the trunk is formed by a basin-like structure, the pelvis, which is made up of the innominate bones at the sides and in front, and a triangular mass of bone known as the sacrum behind. The sacrum consists of five vertebrae fused together and has at its tip the coccyx. The gaps which exist in the skeleton are filled in by muscles and membranes, so that a closed basin is actually formed. The floor of the basin is pierced by the urethra and anus, however, and in the female by the vagina as well. The pelvis is described as consisting of two parts, the true pelvis and the false pelvis. The latter is the part on a level with the expanded portions of the iliac bones which is bounded below by a definite ridge or margin, beneath which is the true pelvis. In the true pelvis are the bladder and rectum, and in the female the womb and its appendages. At the back of the pelvis, lying on the front of the sacrum, is the network of nerves known as the sacral plexus. Deformity of the bones of the pelvis, caused by rickets and other disorders, may interpose a serious and sometimes complete obstruction to the birth of a child. Fracture of the pelvis may happen when a person is run over by a heavy vehicle. *See* Fracture; Hip; Innominate.



PELVIS. Bones composing it seen from the front (left) and back

PEMPHIGUS. A burn or some other kind of irritation, including microbic, may cause large blisters, or bullae, on a skin or mucous surface, but when bullae occur from some obscure reason the condition is described as pemphigus. Butchers and others who handle dead animals are liable to be infected through cuts or abrasions on the hands and suffer from what is called acute febrile pemphigus. Fever occurs with headache and great thirst, and 24 to 48 hours afterwards bullae appear, usually on the neck and limbs. The disease may be subacute without much fever, but bullae form on mucous membranes, and then on the skin, and there is an early development of profound general depression, described as the typhoid state. In either form recovery is very exceptional, and the possibility of the disease occurring makes it very necessary to disinfect cuts, etc., most carefully. A chronic form of pemphigus occurs, bullae first appearing on mucous membranes, especially on that of the mouth, and later on the skin. There is no pain and the general health does not suffer at the beginning, but later it does in a serious way. Quinine, in large doses, or organic arsenical preparations, are used internally, and sedative and antiseptic lotions and drying powders are applied externally. *See* Dermatitis ; Skin.

PENNYROYAL. Oil of pennyroyal is used as a domestic remedy for flatulence and colic, but should not be given to women except on medical advice, as in certain circumstances it may be dangerous. A half to one teaspoonful in an ounce of olive oil or vaseline, if smeared on exposed parts, may ward off midges and other troublesome insects.

PEPPERMINT. From the peppermint plant there is distilled the essential oil of peppermint, which is used as a carminative and anti-spasmodic, the dose being ½ to 3 minims. From this oil are prepared peppermint water, dose 1 to 2 oz. and spirit of peppermint, dose 5 to 20 minims.

PEPSIN. The main digestive ferment in gastric juice is pepsin, which acts on protein foodstuffs. This ferment is extracted from the gastric mucous membrane of the pig, sheep or calf, and is used to assist digestion.

PEPTONE. The ferments pepsin and trypsin in the digestive juices convert protein foodstuffs into a simpler protein known as peptone. This is obtained artificially from meat and occurs as a whitish powder. It is sometimes injected into the body in the treatment of asthma. Food is peptonised by admixture with trypsin, the ferment of the pancreatic juice, the process as regards milk being described under that heading.

PERICARDIUM. The heart is enclosed in a bag known as the fibrous pericardium, but inside this is another bag formed of a tough, smooth membrane, which lines the fibrous bag and is reflected on to the heart. This second bag is the serous pericardium and it permits of the heart working without friction. Inflammation of the serous pericardium is called pericarditis. The surface of the membrane becomes roughened so that a scraping or shuffling sound, caused by the movement of the two roughened surfaces over each other and synchronous with the movements of the heart, is audible on listening over the organ. There may also be pain and a rise of temperature. The process may not stop short here, but go on to the effusion of fluid into the serous bag, and this may seriously interfere with the heart's action, causing dyspnoea. The most frequent cause of pericarditis is acute rheumatism, but it may occur in other infectious fevers, from tuberculous infection or from other causes. The causative disease must be treated and counter-irritation applied over the heart. *See* Heart.

PERIMETRITIS. Inflammation of the peritoneum covering the organs in the pelvis is called perimetritis or pelvic peritonitis. Infection usually comes from the genital tract, but it may come from a diseased appendix or from some other part of the bowel. When acute there is severe pain and tenderness, high fever and probably vomiting, while the abdomen is swollen and tympanitic. The condition may gradually lessen in severity and in about a fortnight settle down into a chronic condition; or at any time there may be an extension of the infection and general peritonitis. In chronic perimetritis there is an extensive formation of adhesions, matting the organs together and probably displacing them. The treatment of the acute disorder resembles that of parametritis (q.v.), but if a diseased appendix is suspected an operation will be necessary, and also if there is much pus.

PERINEUM. The area on the lower part of the trunk, corresponding to the outlet of the pelvis, is called the perineum. In this region is the opening of the bowel, or anus, and the external genital organs. In females there is a wedge-shaped mass of tissues between the lower portions of the vagina and rectum. This is called the perineal body, the skin covering it usually being referred to simply as the perineum. These tissues stretch during childbirth to allow the passage of the child.

PERIOSTEUM. The fibrous membrane covering the surface of bone, except where this is clothed with cartilage, is called the periosteum. It contains a free supply of blood vessels which contribute to the nourishment of the bone, and a piece of bone, denuded of its periosteum, necroses or dies if the uncovering is at all extensive. Inflammation of this membrane, or periostitis, may be acute or chronic. Simple acute periostitis may be caused by an injury, say a kick on the shin. There is a hot, painful swelling, largely caused by effused blood. Rest is required. If the skin is not broken cold applications may be applied, otherwise hot boracic fomentations are indicated. Acute inflammation from septic infection occurs as a rule with the inflammation of the bone itself. *See* Bone; Osteitis; Osteo-myelitis.

PERITONEUM. The smooth, thin membrane that lines the abdomen is called the peritoneum. It forms a closed bag, except for the opening of the Fallopian tube in the female, but from the posterior wall of the abdomen and the floor of the pelvis the organs push forward into this bag and fill it up, notably the bowel, of which the peritoneum forms the mesentery (q.v.). Inflammation of the peritoneum is called peritonitis, and may be acute or chronic, and localised or general. A localised peritonitis may occur when a chronic inflammatory process, such as a gastric ulcer, or infection of low virulence, as in some cases of appendicitis, affects the peritoneum. On the adjoining surfaces of the peritoneal bag lymph is poured out and glues the surfaces together, thus shutting off the cavity of the peritoneum. Should, however, the stomach rupture into the cavity, or an appendix abscess burst into it before this shutting off could take place, there would be general peritonitis.

This may also be caused by wounds of the abdomen, by obstruction or rupture of the gut, by extension of infection from the Fallopian tube, by rupture of the womb and so on. Chronic peritonitis, whether localised or general, is characterised by glueing of the surfaces of the membrane, resulting in the formations of adhesions and the matting together of adjoining viscera. A more extensive chronic peritonitis may result from cancer affecting one of the abdominal organs, leading to adhesions and the accumulation of fluid in the abdomen. Otherwise the usual cause is tuberculosis, children being generally the victims. In some instances thickening of the peritoneum, adhesions and matting of the intestines are the prominent features, but in others it is the accumulation of fluid or ascites. The general treatment for tuberculosis, including fresh air and sunlight, is required. Acute general peritonitis is a very serious disorder. There is great pain in the abdomen, which becomes distended and tender. The bowels are paralysed, and there is stagnation of their contents. Generally an operation is required to deal with the source of infection. *See* Abscess; Appendicitis; Lymphatic System.

PERNICIOUS ANAEMIA. *See* Anaemia.

PERSPIRATION. *See* Sweat.

PESSARY. An apparatus for supporting the womb and preventing its displacement is called a pessary. Different types are used according to the circumstances of each case. One consists of a round ring with a core of watch-spring and a soft rubber covering, and is much used. Others commonly used are vulcanite rings moulded into various shapes. All pessaries of these types should be inserted and removed by a doctor. They should not be worn for longer than three months without renewal, as they tend to become corroded and may irritate. Also, while a pessary is being worn the patient should douche every day with lysol solution, a teaspoonful in two pints of warm water.

The term pessary is also used for large suppositories intended for introducing drugs into the vagina. Some contraceptive pessaries are of this kind, but another, the check pessary, is an apparatus to cover the neck of the womb.

PHAGEDAENA. A rapidly spreading ulceration associated with sloughing, or gangrene (q.v.), is described as phagedaena. It sometimes occurs in connexion with a venereal sore, or chancre, but might complicate any wound. This, however, is rare nowadays except in the tropics, where an ulcer of this description is variously termed a tropical ulcer, Aden ulcer, etc.

PHAGOCYTE. Certain blood corpuscles and body cells attack and destroy bacteria and other harmful bodies by ingesting them. Such a cell is called a phagocyte, and the process, phagocytosis. This is an important factor in causing immunity (q.v.).

PHARYNX. The cavity behind the nose, mouth and larynx is known as the pharynx. When one breathes through the nose, as is proper, the pharynx forms a continuous tube, but, in swallowing, the portion behind the nose, called the naso-pharynx (q.v.), is shut off from the rest by the ascent of the soft palate. The portion behind the mouth and larynx, to which this account will be limited, has behind it the cervical vertebrae, from which it is separated by ligaments and muscles. In front it has the fauces and the base of the tongue, and below this the epiglottis and the entrance into the larynx. At the level of the cricoid cartilage of the larynx it becomes continuous with the gullet. The wall of the pharynx consists of a membranous bag, outside which are three flat muscles, and inside, a lining of mucous membrane. Inflammation of this lining is termed pharyngitis.

Acute pharyngitis, a form of acute sore throat, may be due to a common cold, to a rheumatic poison, to other infections, to irritation by vapours or hot or otherwise irritating food or liquor, and so on. The mucous membrane is red and angry-looking, and white or yellowish mucus adheres here and there in patches. Swallowing and speaking are painful and there is usually a dry, irritating cough. The general treatment will depend on the cause. If this is judged to be rheumatism it should be on the lines of that for acute rheumatism, and the fact that heart complications are possible should be borne in mind. In all cases talking should be avoided and the food should be at most semi-solid, and should be bland and not too hot. Hot applications to the neck may be useful. The inhalation of steam from a jug of hot water to which a teaspoonful of Friar's balsam has been added is often very soothing. The throat may be gargled with a warm, weak solution of permanganate of potash (q.v.), lozenges of menthol or krameria may also be sucked.

Chronic pharyngitis may be caused by the excessive use of alcohol, tobacco or condiments. It is common also in those who have to talk much, especially when the voice is misused. The mucous membrane may be reddened. Commonly there is an irritating cough which may excite nausea. Treatment must be directed to any general disorder, or to dyspepsia or constipation if such exist. Tobacco, alcohol and condiments should be stopped. The voice must be rested when necessary. The inhalation, gargle and lozenges above mentioned may be useful.

An abscess behind the pharynx, which is referred to as a retropharyngeal abscess, may be acute or chronic. An acute abscess is commonest in children. A child suffering from such an abscess adopts rather a characteristic attitude, with the head thrown back and towards one side and the mouth open. Surgical treatment is necessary. *See* Clergyman's Throat; Mouth; Naso-pharynx.

PHENACETIN. A coal-tar derivative, phenacetin occurs as colourless, scaly crystals, without smell or taste. It is usually given in cachets, tablets or a little gruel. The dose is 5 to 15 grains. Phenacetin is mainly used to relieve headache and other pains, and as it may cause some depression a little caffeine (q.v.) is often combined with it.

PHIMOSIS. Undue length and tightness of the foreskin, so that it cannot be pulled back clear of the glans penis, constitutes phimosis. The passage may be so narrow as to obstruct the flow of urine, but in any case there is an accumulation of smegma, the thick white, or yellow, secretion from the membrane behind the edge of the glans, and this secretion causes much irritation and possibly inflammation of the glans, or balanitis. Phimosis is usually congenital. It may cause a habit of bed-wetting and perhaps self-abuse. It is frequently a cause of rupture. It should be treated by circumcision (q.v.).

PHLEBITIS. *See* Vein.

PHLEGMASIA. *See* White-leg.

PHOBIA. Certain individuals have a dread of some situation, action or thing; for example, of being in a closed space or, on the contrary, an open space. These fears do not depend on a lowered state of health, nor can the individual find any explanation for his fear in any of his experiences. Such a fear is described as a phobia. The only treatment likely to be quite satisfactory is psycho-therapy, and especially psycho-analysis.

PHOSPHORUS. A non-metallic element, phosphorus occurs in two forms, the white and the red. The former rather resembles wax in appearance and consistency. It gives off fumes in the air and is luminous in the dark; it readily ignites. Red phosphorus is hard and brittle; it does not fume nor is it luminous. Phosphorus is a constituent of protoplasm, and also occurs in the body as phosphates, in bone and other tissues.

POISONING BY PHOSPHORUS. Acute phosphorus poisoning has generally occurred from consuming match-heads made with white phosphorus or rat-paste. There is a feeling of heat in the mouth, throat and stomach, vomiting and occasionally diarrhoea. The vomited matter and faeces are luminous in the dark and smell of garlic. The patient may apparently recover, but in from three to five days jaundice occurs, with renewed vomiting. There may be convulsions and coma or severe bleeding from the stomach and bowels. The heart is greatly weakened.

The first-aid treatment consists in giving an emetic of mustard and water and washing out the stomach by giving large draughts of a weak solution of permanganate of potassium at a tepid temperature. No oils or fats should be given.

Chronic phosphorus poisoning generally occurs in the form of phossy jaw, that is, necrosis of the lower jaw. This can occur when teeth are carious or a tooth has been extracted, the direct cause being the fumes given off from white phosphorus. The action of the fumes lays the affected bone open to the attack of microbes and especially the tubercle bacillus, so that the resulting disorder is almost always tuberculosis of the jaw.

PHTHISIS. *See* Consumption.

PILES. Haemorrhoids, or piles, consist of dilated and varicose veins at the anus or in the lower inch or two of the rectum. An external pile forms a little brownish fold of skin radiating from the anus. It may cause no trouble or only a little itching. Internal piles may consist of thickened folds or of rounded masses with more or less of a stalk, covered with mucous membrane which is reddish-blue in colour. Both varieties cause a sense of fullness and weight in the bowel. The first variety is apt to cause prolapse, or falling down, of the lining of the bowel, so that it protrudes through the anus ; the second are liable themselves to prolapse, and also cause bleeding, perhaps to a serious extent. Internal piles sometimes become inflamed and the blood in the veins may clot, or thrombose. These occurrences give rise to considerable pain and distress. Sometimes the neck of a prolapsed pile is compressed by the circular muscle, or sphincter, of the anus and the pile is strangulated. It swells up and is very painful and tender, and if not replaced may slough off. An external pile may also become inflamed, when it forms a tense, bluish swelling, which is painful and tender.

Piles may be caused by chronic constipation, sedentary habits, congestion or cirrhosis of the liver, the pressure of the pregnant womb or of a tumour, and in other ways. Bleeding from the bowel may have other causes than piles, and, especially after middle age, it should not be assumed that the bleeding is necessarily due to this cause.

When piles exist, whether internal or external, constipation (q.v.), if present, should be corrected. No preparation of aloes should be used as a purgative, however. The anal region must be kept very clean ; it should be washed once a day at least. Only a soft, smooth toilet paper should be used and sometimes a soft rag is the best thing. A little witch-hazel or hamamelis ointment should be smeared round the anus if there is irritation, and, when there are bleeding internal piles, this ointment or gall and opium ointment should be introduced into the bowel. Care should be taken against getting the feet wet and cold, and cold seats should be avoided.

Should an external pile become inflamed rest in bed for a day or two, opening the bowels thoroughly by means of a large enema, and the use of hot fomentations will probably cause the inflammation to subside. Inflamed internal piles require similar treatment but it will be more prolonged. *See* Fissure.

PITUITARY BODY. The small structure called the pituitary body is situated in the base of the skull, in a cavity in the sphenoid bone. It consists of two connected lobes. The anterior lobe is glandular in structure and its secretion stimulates growth, as over-activity of this lobe during the growing period causes giantism and later in life the disease called acromegaly (q.v.). Deficient activity, on the other hand, results in failure of bodily and sexual development, a condition described as infantilism. The posterior lobe produces an internal secretion which causes contraction of all arteries except those of the kidney, and of plain muscle in the bowels, the bladder, the womb and other organs. It also has something to do with the metabolism of carbohydrates. Deficiency of the secretion leads to obesity. An extract of the posterior lobe, known as pituitrin, is used, by injection into the body, in a variety of disorders, including shock, in which it raises blood pressure. *See* Endocrine.

PITYRIASIS. Various skin disorders, in which fine branny scales appear, are described as pityriasis. In pityriasis rosea, which occurs usually in late spring or early summer, a patch, known as the herald patch, appears on the front or side of the chest. It is oval in shape and has a slightly raised rose-coloured border with fine scales. After a week or two similar patches, but smaller, appear in crops on the trunk and legs. All the treatment necessary is to dust with some bland powder.

Pityriasis simplex is discussed under the heading Dandruff. Pityriasis versicolor is the name given to a rash which is most often seen on the front or back of the chest. It is light to dark brown in colour and slightly scaly, and is caused by a fungus, microsporon furfur. The parasite may be killed by painting with tincture of iodine or by sulphur ointments or baths. Pityriasis rubra of Hebra, also known as dermatitis exfoliativa, is characterised by redness of the skin and peeling of the skin in large, thin flakes. It is very debilitating and death may occur. Confinement to bed is necessary during the acute stage. Sulphur baths, a free use of lead lotion, and, later, sedative ointments usually constitute the local treatment. In pityriasis rubra pilaris there are also redness and scaling, but in addition there are papules. Arsenic and thyroid are used internally, and externally ointments containing ichthyol or tar with salicylic acid. *See* Dandruff ; Lichen ; Psoriasis ; Seborrhoea.

PLACENTA PRAEVIA. The after-birth (q.v.) is technically known as the placenta. When this organ is situated in the lower part of the womb, an occurrence described as placenta praevia, contractions of the womb tend to loosen the attachment of portions of the placenta and so cause bleeding. This may occur from the end of the second month onwards, and dangerous amounts of blood may be lost.

PLAGUE. Endemic in the East, plague, or the pest, breaks out in epidemics from time to time. It was this disease that ravaged Europe in former centuries and was known as the Black Death. It is caused by a microbe, the bacillus pestis, which may infect rats and the fleas which feed on them. The disease may therefore be carried on ships to European ports and be disseminated by fleas. This is the usual mode of infection in what is called bubonic plague, but in pneumonic plague infection takes place from breathing in particles carrying the microbe. The period of incubation is about three days as a rule, after which the victim is suddenly smitten with high fever and prostration. Very soon a gland, usually one in the groin, becomes enlarged and tender, and then other glands. A mass of such glands constitutes a bubo. The general condition may begin to improve on the fourth or fifth day, or may go on worsening to a fatal issue.

The treatment of plague is mainly symptomatic. The state of fever (q.v.) must be dealt with, precautions detailed under the heading Infectious Disease being observed. Sera, such as Yersin's, are used, but opinions vary widely as to their usefulness. This is true also of Haffkine's prophylactic serum. Stress must be laid on the destruction of rats as a preventive measure.

PLASTER. An emplastrum, or plaster, is a solid, adhesive preparation for external application. The plaster is spread on cotton, linen, or some other kind of backing. Most plasters contain a proportion of lead plaster. *See* Adhesive Plaster.

PLETHORA. An excess of blood in the vessels is described as plethora. A plethoric person has a red face, and is liable to bleeding at the nose and, if a woman, to a very free monthly flow. There is usually a sense of fullness in the head, and after middle life plethora much increases the risk of apoplexy. The condition should be combated by a restricted, though adequate, diet, the avoidance of alcohol and by taking open-air exercise. *See* Blood ; Congestion.

PLEURA. The inner surface of the wall of the chest is lined by a smooth membrane known as the pleura, which, at the root of the lung, is reflected on to this organ and completely covers it. The pleura on either side thus forms a closed bag, although normally its walls are always in contact (*see* illustration in page 470). The existence of the bag is shown in some diseases or injuries by the accumulation of fluids or air in its cavity. From a chest wound, from rupture of an aneurysm and other causes, blood may accumulate in a pleural cavity ; this is called haemothorax. Unless there are reasons against it, the blood is aspirated from the chest in order to relieve the lung. An accumulation of more or less clear fluid occurs in pleurisy with effusion, commonly referred to as wet pleurisy, or it may be dropsical, as in some cases of nephritis or heart disease, when it is called hydrothorax. Air in the pleural cavity is called pneumothorax. It is usually due to rupture of a tuberculous cavity in the lung into the pleura.

PLEURISY. Inflammation of the pleura is called pleurisy. It may be due to extension of inflammation from some part covered by the pleura, notably from the lung in pneumonia or tuberculosis. It may also occur in acute rheumatism and in some of the specific fevers, in Bright's disease and so on. A primary inflammation of the pleura, however, is presumably tuberculous. The opposing inflamed surfaces of the pleura become covered with a fibrinous exudation which causes friction when the surfaces move over each other. This gives rise to the sharp, stabbing pain felt in pleurisy and increased by coughing and deep breathing, and to the friction sound heard by the doctor when listening over the chest. It is called dry pleurisy. Often, however, following on this there is the effusion of fluid into the pleural cavity, what is called wet pleurisy. The fluid separates the two layers of the pleura and pain and coughing probably cease.

The temperature usually rises in pleurisy, though not often above 101° F. A person suffering from pleurisy should be confined to bed, whether there is fever or not. Pain may be relieved by poultices, fomentations or a mustard plaster, but sometimes an opiate is required. Iodine, painted on the chest may also be of value, but is oftener used to promote absorption of the effusion. Diuretics and saline purgatives may be helpful to this end. Should effusion persist for a week, however, it ought to be drawn off. Expansion of the lung may be furthered by making the patient blow up balloons or blow water from one bottle into another to which it is connected by tubing.

Thickening of the pleura may remain after pleurisy, and sometimes adhesions between the two layers, interfering with the movement of the lung. Sometimes the effusion becomes purulent, the condition then being called empyema. As primary pleurisy is likely to be tuberculous, sunlight, fresh air and other methods of combating this disease should be employed. *See* Aspiration; Empyema; Lung; Pleura; Pneumonia.

PNEUMOCONIOSIS. *See* Dust Disease.

PNEUMOGASTRIC NERVE. The 10th cranial, or pneumogastric, nerve is also called the vagus nerve, on account of its long, wandering course. It arises from the bulb, or medulla, of the brain, and after leaving the skull traverses the neck and chest to the abdomen. It sends a little branch to the external passage of the ear, which accounts for the coughing sometimes caused by a plug of wax in the ear or during the operation of syringing. It sends branches to the pharynx, the larynx, the heart, the lungs, the stomach, the liver and the spleen. Impulses down this nerve to the heart slow its rate of beating, and if the nerve is sufficiently irritated the heart may be stopped altogether.

PNEUMONIA. Two morbid conditions in the lungs are described as pneumonia. In one there is an involvement of the smaller subdivisions of lung tissue, the lobules, and this is called broncho-pneumonia (q.v.). In the other, one or more entire lobes of one or both lungs is concerned, and this is called lobar pneumonia ; when the word pneumonia is used without qualification it is generally this type that is meant.

Lobar pneumonia is properly regarded as a general disease, a specific fever, with a special involvement of the lungs. It is caused by germs circulating in the blood, the most usual one being the pneumococcus. Infection is generally acquired from the breath of a person suffering from the disease or from that of a carrier (q.v.). The incubation period is from one to seven days and the onset is sudden, generally with a chill. The temperature rises quickly, and soon there is a short cough, which, however, the patient may try to suppress because it causes a sharp, cutting pain in the side ; for the same reason the breathing may be shallow. The pulse is rapid, but the respiratory rate is more so in proportion. The sputum brought up by coughing is very sticky and brownish in colour. It is referred to as a rusty sputum. Sometimes, however, it is blood-red. The cheeks are flushed, and frequently there are crops of blisters, or herpes, round the mouth. The tongue is furred, and as the disease goes on may become dry and brown. Sleeplessness is apt to be troublesome, and delirium is common and may be violent. After some days the fever begins to abate, and usually terminates by crisis. The patient commonly falls into a deep sleep while this is taking place, from which he awakes feeling very much better.

In adults the disease usually affects the base of the lung. The apex is the commonest site in children. It may extend to other lobes and possibly to the other lung, when one speaks of double pneumonia. The changes in the lungs consist of acute congestion, followed by filling up of the air cells with fibrin and red cells, a state of affairs described as consolidation. Later this red substance is invaded by a host of white blood cells, and it becomes liquefied and is discharged through the air tubes, or absorbed ; this is the stage of resolution. There is usually an extension of the inflammation to the adjoining pleura, and it is the accompanying pleurisy that accounts for the sharp pain. The pleurisy usually clears up when resolution takes place, but it may not do so, and a collection of purulent fluid, or empyema (q.v.), may occur in the pleural cavity. Again, resolution may be delayed, and sometimes it is incomplete, so that a chronic inflammatory process goes on which leads to fibrosis (q.v.) of the lung.

The general treatment of pneumonia is that of fever (q.v.), but as it is infectious the provisions for isolation described under the heading Infectious Disease should be carried out. In no disease is good nursing of more importance, and as the patient must be constantly under observation both a day and a night nurse will be necessary. Pain is usually relieved by a poultice (q.v.), but an injection of morphia may be necessary. Often the patient is put into a pneumonia jacket (Plate 49). He should be propped up in a sitting position to aid circulation through the lung. Stimulation of the heart by alcohol, digitalis, etc., may become necessary. If the patient tends to become livid, the inhalation of oxygen is of value. To aid in the expulsion of the sputum, a cough mixture is often given.

Those in attendance on the patient should bear in mind the possibility of infection, and should gargle the throat several times with some antiseptic, say, a weak solution of permanganate of potassium. A gauze respirator may usefully be worn, especially when it is necessary to come close to the patient. The sputum should be received in a jar containing lysol solution, a teaspoonful to the pint, and should not be allowed to adhere to the sides of the jar. The mouth is wiped with paper handkerchiefs, which should be burnt at once. *See* Broncho-pneumonia ; Lung ; Nursing.

POISONING. In few emergencies can sagacious first aid be of such service as in that of poisoning. It may be known that poison has been swallowed or otherwise may have got into the body and the nature of the poison may even be known. Without this knowledge, however, the probability of poisoning would be recognized when a person becomes ill shortly after taking food, drink or a dose of medicine.

Some poisons destroy tissues with which they come into contact, and are known as corrosives. There is evidence of destruction of the lining of the mouth, and possibly marks on the face and clothing. Such poisons cause an immediate burning pain in the mouth, throat and stomach, also vomiting, and perhaps purging. There may be difficulty in breathing. The patient is more or less collapsed. Amongst the corrosive poisons are the strong mineral acids, such as oil of vitriol ; the caustic alkalies, such as strong ammonia, corrosive sublimate, formalin, oxalic acid, certain metallic salts, etc. Carbolic acid, and creosote also cause a burning pain, but vomiting is uncommon, and there is a sense of giddiness, followed by unconsciousness.

Irritant poisons may or may not occasion a hot feeling during swallowing, but they cause nausea, vomiting, abdominal pain, purging, and more or less collapse. Some cause difficulty in breathing, and some cramps in the legs. They include antimony, arsenic, copper, lead, mercury, zinc, croton oil and other strong purgatives, arum, cantharides, etc. Narcotic poisons may, like opium, cause immediate somnolence, deepening into sleep and coma ; or, like belladonna, there may be pronounced delirium for a time and then coma ; or, like alcohol and nitro-benzene, they may cause signs of intoxication, followed by coma. Some poisons, including aconite, diluted oxalic acid, prussic acid, etc., cause great depression of the heart, while others, such as hemlock, calabar bean and curare, cause muscular paralysis. Nux vomica, strychnine and brucine, cause convulsions.

In the event of poisoning a doctor should be sent for at once, and should be told what poison has been taken if this fact be known. In the meantime, first aid should be rendered promptly. If the nature of the poison is known, instructions as to its treatment will be found under the appropriate heading, but, if not, treatment should be along the lines to be now laid down.

If the poison is a corrosive, on no account should an emetic be given, as vomiting might cause perforation of the stomach, but in all other cases, if the patient can swallow, an effort should be made to empty the stomach. To this end, a tablespoonful of mustard, or two tablespoonsful of common salt, may be given in a tumbler of warm water. Vomiting may be hastened by tickling the back of the throat with a feather or a paper spill, and when it begins the patient should drink large draughts of tepid water.

In the next place, or in the first, when dealing with a corrosive poison, something should be given to neutralise the activities of any drug remaining in the stomach; a list of the appropriate things to use for each poison is given under the heading Antidote. A strong infusion, or decoction, of tea is usually a good thing to give. The irritation caused by a corrosive or irritant poison may be lessened by giving demulcent drinks, such as milk, thin gruel, thin cornflour or arrowroot, olive oil, or white of egg in water. Oil should not be given, however, in poisoning by cantharides or phosphorus, and as little water as possible in poisoning by oxalic acid or lysol. When poison has been in the stomach for some time some of it may have passed into the bowel, in which case one or two tablespoonsful of castor oil, or a tablespoonful of Epsom salts in a tumbler of warm water, are given.

For difficulty of breathing caused by corrosive poisons, hot cloths should be put on the neck, and the air may be moistened with steam by means of a bronchitis kettle (q.v.), which can be improvised if necessary. Pieces of ice should be given to the patient to suck. Faintness and collapse are treated by keeping the patient lying down in bed and promoting warmth by blankets and by putting hot-water bottles, covered with flannel, at the feet and by the sides. Stimulants should be given in the shape of sal volatile, a teaspoonful in a wineglass of water, whisky or brandy, a teaspoonful or more, according to age, etc., well diluted, or strong tea or coffee. If the patient is unconscious, one or two tablespoonsful of diluted spirits, or, when a narcotic poison has been taken, a pint of coffee may be injected into the bowel. Give no alcohol in poisoning by aniline, nitro-benzene, or related poisons.

Pain or cramps are treated by placing large hot fomentations or poultices over the affected parts. If breathing ceases, artificial respiration should be started at once. Any bottles found near the patient, or any vomited matter, should always be kept for the doctor's inspection. *See* Antidote; Artificial Respiration; Asphyxia; Collapse; Emetic; Fainting; Shock.

POLIOMYELITIS. Inflammation of the grey matter in the spinal cord is called poliomyelitis. Acute anterior poliomyelitis is better known as infantile paralysis (q.v.).

POLYPUS. The term polypus is used for a tumour which hangs by a stalk from the surface of a body cavity. An aural polypus consists of granulation tissue, the overgrowth of this tissue being caused by chronic irritation in the ear. A nasal polypus consists of a soft overgrowth of the mucous lining, also due to chronic irritation. A rectal polypus is usually a growth of the nature of an adenoma, or gland tumour. Polypi should be removed, a simple matter when they are readily accessible.

POTASSIUM. An elemental metal belonging, like sodium, to the alkaline group, potassium is a normal constituent of the body, being especially abundant in the solid tissues. Some of its compounds are used in medicine and act similarly to those of sodium, except that potassium, if given in large doses or over a long period, is depressing to the heart and nervous system.

Potassium carbonate, also known as salt of tartar, the dose of which is 5 to 20 grains, and potassium bicarbonate, dose 5 to 30 grains, are used as alkalies in dyspepsia. Crude potassium carbonate is sold for cleansing purposes as potash or pearl-ash. It acts as a corrosive alkaline poison. Potassium hydroxide, or caustic potash, is sometimes used in the form of a pencil as a caustic. Potassium sulphate, 15 to 45 grains, potassium tartrate, 30 to 240 grains, and acid tartrate of potassium, or purified cream of tartar, 15 to 60 grains, are used in solution as mild purgatives; potassium acetate and potassium citrate, the dose of each being 15 to 60 grains, are given for a diuretic action.

Potassium nitrate, also called nitre and saltpetre, dose 5 to 20 grains, is much used in fumigating powders for asthma (q.v.). Potassium chlorate, 5 to 15 grains, has a remarkable effect in restoring health to disordered mucous membranes, and is a common constituent of a mouth wash. There are lozenges of potassium chlorate, containing 3 grains each, which are sucked for relief to a sore throat. Potassium permanganate is discussed under the heading Manganese; potassium bromide under Bromide; and potassium iodide under Iodine. Potash water is simple aerated water containing a small quantity of potassium bicarbonate. *See* Sodium.

POTT'S DISEASE. Tuberculous disease of the spine is called Pott's disease. The bodies of the vertebrae are the parts most often affected, and, as bone is destroyed, the spine gives way at the site of the disease, the vertebrae above and below coming closer together and so causing a sharp backward projection of the spine, usually referred to as hunchback. The bending of the spine may be sufficient to cause compression of the spinal cord and paralysis. There may also be a lateral curvature of the spine. The softening of tissues leads to the formation of a cold abscess, described under the heading Abscess.

Pott's disease is more common in children. Pain occurs in the back, and may date from a fall or a blow. Tenderness may also be detected over the affected vertebrae, and the back is held rigid. The general health may be good in the early stages, but as time goes on it fails rapidly. Early treatment may be successful in preventing deformity. Absolute rest in bed is necessary, and for a space of two years at least, so that treatment should properly be carried out in an institution. It may be possible to correct deformity or to fix the spine and so hasten recovery by apparatus, and, possibly, operation. The general treatment of tuberculosis by sunlight, fresh air, etc., is indispensable. *See* Backbone ; Spinal Curvature ; Tuberculosis.

POULTICE. A prolonged application of moist heat is most easily secured by the use of a poultice, and this is generally made with linseed. The materials required are one or two pounds of linseed, a large bowl, a spatula or blunt-edged knife, boiling water, a piece of calico of the proposed area of the poultice with an inch to spare all round, and a piece of jaconet, or thin macintosh, sufficiently large to overlap the poultice all round by an inch at least (Plate 50). The bowl is warmed and a sufficient amount of boiling water for the size of poultice required is poured in ; for an adult it will be about three-quarters of a pint. Linseed is then slowly added, being constantly stirred with the knife, previously dipped in boiling water, until the mass has the consistency of thick porridge. The poultice is then emptied out on the calico and quickly spread, leaving a margin of an inch, which is then turned over the poultice. This is now tested against the cheek or the skin of the forearm of the nurse, to prevent scalding, then applied and covered with the jaconet or macintosh. Sometimes a layer of cotton wool is put over this. Such a poultice should retain its heat for many hours. An alternative method is to have a flannel bag with a broad flap, and, when for use on the back, with tapes attached to the four corners. The poultice is emptied into the bag and spread out in a layer. The tapes serve to keep the bag in position.

Bread, cut up into little cubes, may also be used to make a poultice ; or else, instead of an ordinary poultice, one might use the kaolin poultice B.P.C. The method of making a starch poultice is described under the heading Eczema.

PREGNANCY. For a first conception the most likely period is between twenty and thirty years of age, and intercourse is most often fruitful just after a menstrual period or during the week preceding it. From the seventeenth to the twenty-fourth day after the beginning of a period it is very unlikely to be fruitful. In certain circumstances a woman ought not to become pregnant, on account of danger to her own life or the likelihood of bearing a diseased child, possibilities which would exist much less frequently were people with bad personal health or bad family histories to refrain from marrying. When necessary, advice should be got from a doctor about the methods of contraception.

A woman who conceives almost always misses her next period and does not menstruate again until after the child is born. In the sixth week morning sickness may begin ; there may be actual vomiting on getting up, or only nausea. This symptom usually persists till the fourth month, but may continue longer. About the time that sickness begins it will probably be found that the breasts are beginning to enlarge, that the veins on them are more prominent and that the areola round the nipple is enlarging and becoming darker in colour. From the end of the sixteenth week fluttering or thumping movements, referred to as quickening, may be felt in the lower abdomen. During all this time the womb has been enlarging and undergoing certain changes which a doctor could detect by examination, and after the first few months there is a quite definite enlargement of the abdomen.

Pregnancy is quite a normal process and usually proceeds throughout without upsetting the health, but in certain circumstances disagreeable and sometimes dangerous incidents attend it. The claims of the growing child, for example, on lime salts may starve the teeth and bones of the mother. Thus, dental caries is common in pregnancy, and, though the occurrence is not at all common, a softening of the bones, known as osteomalacia may result from the same cause. Sickness also may be so frequent and severe as to menace health or even life, a condition described as pernicious vomiting. Some pregnant women have a desire for raw oatmeal, unripe green apples and other unsuitable things. Constipation is common in pregnancy and piles may be troublesome. Frequently also there are varicose veins in the legs. Pressure on the veins in the pelvis is responsible for piles and for varicose veins. The state of the veins may cause dropsical swelling of the legs, but dropsy may also be due to kidney disease, to which pregnant women are especially liable. Frequent headache or dimness of sight are symptoms very suggestive of kidney disease. Such symptoms may precede convulsive seizures, referred to as eclampsia (q.v.).

Bleeding from the womb may occur. This points to the necessity for rest, quiet and care, as it may mean a threatened abortion. Mental disturbances of some kind may occur in pregnancy and may take the form of actual insanity. A complication which is annoying but of no particular consequence is the pigmentation of the face known as chloasma.

Most of the dangers that threaten a pregnant woman and her child can be avoided or greatly mitigated by timely advice and treatment. As, however, the early stages of these disorders may only be detectable by a doctor, it is necessary that a pregnant woman should keep in touch with her doctor or with an antenatal clinic until her child is born. It is very important, for one thing, that the urine should be examined by a doctor from time to time. A pregnant woman should keep to a plain, good diet, with meat once a day only, and strict moderation in starchy and sugary foods. Milk should be taken freely, as it is rich in the lime that she requires. Plenty of green vegetables and of fruit should be included in the diet. Alcohol should be avoided. While there is a tendency to sickness it is advisable to have a light breakfast in bed and to rest in bed for half an hour afterwards. Any kind of violent exercise is undesirable.

The bowels must be kept regular, and for this purpose many women prefer to take a teaspoonful of castor oil each evening, but cascara sagrada, confection of sulphur and the compound liquorice powder are also good. Strong purgatives should not be taken. Sexual intercourse is best avoided. The elasticity of the skin of the abdomen wall can be increased by massaging daily with olive oil. During the last few weeks of pregnancy an attempt should be made to bring the nipples into the best condition possible by drawing them out gently each day and the skin over them will be made tougher by smearing with a preparation consisting of 2 oz. of compound tincture of lavender with ½ drachm of glycerin.

The usual duration of pregnancy is about 280 days. One way of calculating the probable date of childbirth is to count three months back from the beginning of the last menstrual period and add ten days. The actual date may be a few days on either side of the date thus ascertained. *See* Abortion ; Bacilluria ; Childbirth ; Eclampsia.

PRESBYOPIA. *See* Eye.

PRESCRIPTION. A medical prescription consists of several parts. First there is the sign ℞, representing the Latin word recipe, meaning "take." Then follows the inscription, in which the names of the drugs are generally written in contracted Latin words and the quantities represented by signs or contractions, as follows : grain, gr. ; minim, ♏ ; drachm, ʒ ; and ounce ℥. The third part is the subscription, consisting of instructions to the chemist, and the fourth part the signature, or instructions to the patient. *See* Apothecaries' Weights and Measures ; B.P.

PRICKLY HEAT. In the tropics, and especially during the hot season, a rash known as miliaria rubra papulosa, lichen tropicus, or, popularly, prickly heat, is a common event. It is caused by excessive warmth, and is commonly preceded and accompanied by profuse sweating. The rash, which comes out suddenly, consists of little papules and vesicles, due to distension of sweat glands, around which there is at the same time some degree of inflammation. The trunk, back and front, is mainly affected. The part is reddened, and there is heat, tingling and itching. Heavy food, alcohol and iced drinks are prone to provoke an outbreak of prickly heat, and should be avoided. Flannel underwear should be replaced by cellular cotton. Alkaline baths and soothing lotions will be of service. *See* Miliaria.

PROBANG. An instrument used for removing foreign bodies from the gullet is called a probang. That generally used is the umbrella-probang, which has an arrangement of bristles at one end which remain elongated while this end of the instrument is passed beyond the foreign body. Then, by pulling out a stout wire passed through the stem of the probang, the bristles are made to double on themselves and spread out to form a disk, which carries the foreign body in front of it when the probang is withdrawn from the gullet. *See* Choking ; Gullet.

PROGRESSIVE MUSCULAR ATROPHY. This is an uncommon disease in adults in which wasting begins in the hands, and then involves the arms, the legs and the remainder of the body. The wasting is due to degeneration of the nerve cells in the spinal cord which control the muscles, but the cause of this change is not known. There is no pain or other disturbance of sensation throughout the disease. There is a similar disorder in which the motor cells in the bulb, or medulla, degenerate. It is called bulbar paralysis, and here the muscles of the tongue, lips, pharynx and larynx are affected. There is no curative treatment for any of these conditions, although gentle massage may produce some temporary benefit. *See* Muscle ; Myopathy.

PROLAPSE. The protrusion of the lining of a body cavity through a natural opening, or of an organ through a wound, is described as prolapse of the part in question. To the first variety belong prolapse of the bowel or of the vagina.

PROSTATE. In the male the first part of the urethra, or discharge tube of the bladder, passes through a structure shaped rather like a chestnut, and known as the prostate. Inflammation of the prostate or prostatitis, may be acute or chronic, and the commonest cause of both is gonorrhoea. Acute prostatitis is a very painful affection. There are frequent calls to pass water, and this causes pain and straining ; considerable pain may also be caused by defecation. Frequently an abscess forms in the prostate, and may aggravate the symptoms. Strict rest, restriction of diet to bland drinks, and the application of heat, preferably as a hot hip bath, will probably bring relief in acute prostatitis, but if pus forms it must have vent. Chronic prostatitis is the usual cause of gleet, the chronic type of gonorrhoea (q.v.).

An elderly man may suffer from an enlarged prostate ; this may happen under the age of fifty, but only rarely. Generally the enlargement makes the flow of urine slower by causing some obstruction. The patient will next find that he has to pass water more frequently and get up once or twice in the night for the purpose. After a time, when the urine is passed some will be left in the bottom of the bladder. This is known as residual urine, and, sooner or later, it begins to decompose and become irritating, thus giving rise to inflammation of the bladder lining, or cystitis. At any time, a chill or overmuch alcohol may cause retention of urine altogether. One way of dealing with the situation is for the patient to use a catheter (q.v.) regularly ; another, and a better way, is to have the prostate removed by operation. *See* Bladder ; Gonorrhoea ; Urethra.

PROSTRATION. *See* Collapse ; Neurasthenia ; Shock.

PROTEIN. In the chemical composition of living structures a most important position is occupied by complex substances containing nitrogen, and described as proteins. Plants build up such substances from nitrates contained in the soil, and animals obtain their necessary supplies of proteins from plants or from the flesh of other animals. In the process of digestion the complex proteins are split up into simpler forms and ultimately into substances known as amino-acids. These are absorbed from the digestive tract and carried in the blood to the body cells, which use them for building up again the complex protein substances. Again, these are broken down in the course of the activities of living cells and are discharged as urea and other substances which in the soil are converted into nitrates and again utilised by plants. Besides nitrogen, constant elements in proteins are carbon, hydrogen, oxygen and sulphur.

In view of the fact that they are used to build up protoplasm, proteins are commonly referred to as flesh-forming foods, but all the proteins used as food do not split up into the same amino-acids, nor are they of equal importance. Proteins which, on being split up, furnish the amino-acids necessary to health are contained in meat, eggs, milk and fish. *See* Diet; Food.

PROTOPLASM. The substance of which animal and vegetable cells are composed is described as protoplasm. It differs from all other substances in possessing the properties which are distinguished as manifestations of life. About three-fourths of its substance consists of water, and the bulk of the remainder of the complex nitrogenous compounds known as proteins.

PROUD FLESH. Excessive or exuberant granulation tissue (q.v.) is commonly called proud flesh. The cause of the exuberance is the existence of sepsis, and measures must be taken to clean up the wound when proud flesh forms. Astringent lotions are also used, and sometimes the granulations are rubbed over with a crystal of copper sulphate, or blue stone.

PRURIGO. Several types of itchy eruption are described as prurigo, the two most important being what is called Hebra's prurigo and common prurigo. Hebra's prurigo usually begins during the first year of life, either as lichen urticatus, an affection described under the heading Nettle rash, or simply with itching. It leads to much scratching, so that the skin is broken, and infection with pus-forming microbes occurs. Local remedies include such as are described under the heading Itching. The diet must be strictly regulated; sometimes a purely vegetarian one is the best. Cod-liver oil is often a valuable addition.

Common prurigo usually begins about the age of thirty. It may be generalised over the body, or it may be localised at the back of the neck or in other situations. Either form may last for months or years. Treatment is similar to that described above, but in the localised form X-rays or radium give the best results. *See* Itching; Nettle rash.

PRURITIS. *See* Itching.

PRUSSIC ACID. *See* Hydrocyanic Acid.

PSORIASIS. A rather common skin disease, psoriasis occurs as papules, covered with white scales, the papules sometimes being separate, but more often crowded together to form patches. The disease, of which the cause is unknown, begins in early life as a rule, probably with a general distribution of the eruption over the body. It then clears away except for one or two places, where it is likely to persist, namely, the back of the elbow, the front of the knee, and possibly the scalp. Only exceptionally is there any itching or any other discomfort.

An improvement may follow a reduction of protein foods. Arsenic is the drug most often used inwardly, but potassium iodide, thyroid extract, and others are also tried in certain cases. Alkaline or sulphur baths, and a subsequent application of salicylic acid in vaseline, will help to clear off the scales, after which preparations of such things as ordinary tar, chrysarobin from goa powder and mercurials are applied. Treatment, however, should be under medical supervision.

PSYCHO-THERAPY. The influence of conscious thinking on the functions of the body has long been recognised ; also that faith in a physician, or a particular remedy, may be an important factor in bringing about a cure. Every doctor may thus be said to practise psycho-therapy, and certainly the success of many a vaunted patent or secret remedy is an example of it. Unconscious thought processes have also an influence on health, and some disorders are entirely due to such influences. Some of these disorders were at one time treated by ordinary physical methods, but, as the root of the trouble is purely mental, it is but common sense that the treatment should be directed to the mental trouble, and it is to the special methods of doing this that the term psycho-therapy is more properly applied.

The simplest method is sometimes referred to as a therapeutic conversation. The patient discusses the state of his health with his doctor, who explains the nature of his symptoms to him, and may be able to show that fears entertained by the patient are perfectly groundless. Merely to talk over things in this way may effect a cure. Sometimes a doctor authoritatively lays down a proposition which is not directed to the patient's reason, but which is expected to be accepted in the unquestioning fashion of a little child receiving statements from its elders. This is called the method of suggestion, and it may be used with the patient in his ordinary or in a hypnotised state. The method is often enough used, for good or ill, by a person on himself, this being known as auto-suggestion (q.v.).

When it is apparent that a disability is due to some repressed thought, the only way to cure the patient may be to reveal the thought to the patient by the method of psycho-analysis. The patient is requested to relate his thoughts as they occur to him, not directing them or holding anything back, a process described as free association. The doctor watches narrowly for clues to the nature of the repressed ideas. Information may also be got from the interpretation of dreams, and repressed memories may sometimes be recovered by hypnotism. By putting a repressed idea or memory into its proper relationship to the patient's thinking and his disability, the latter may be successfully removed. Also, the realization of the circumstances of a repressed memory or some mental shock may be accompanied by an outburst of emotion, associated with the incident, and this relief may be of much service to the patient. *See* Auto-Suggestion ; Hypnotism ; Mental Disease ; Mind ; Neurosis.

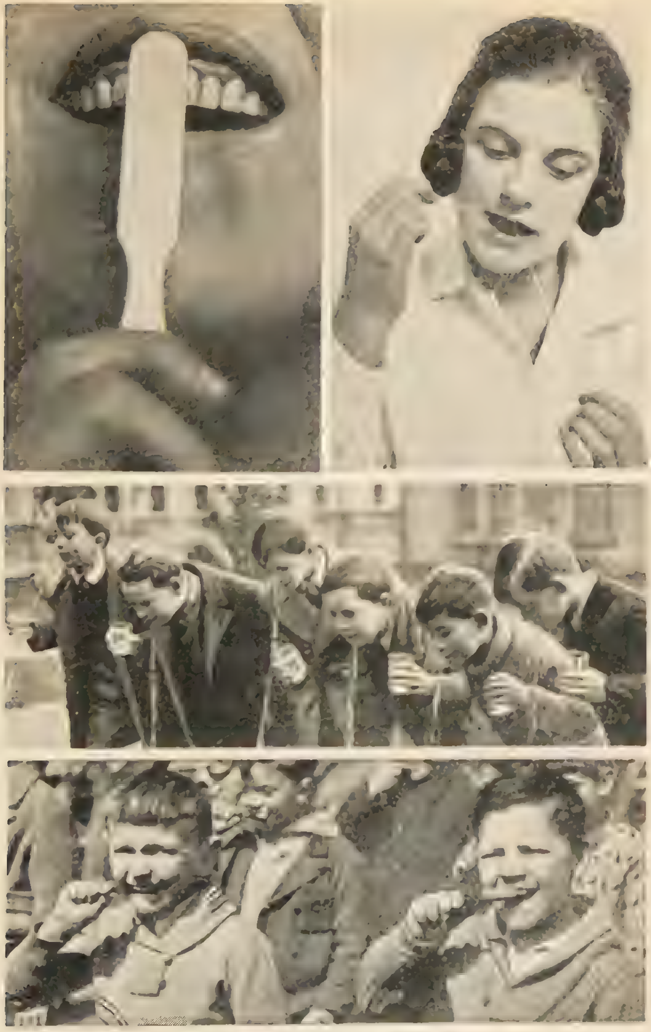
PTERYGIUM. A triangular, fleshy looking fold of conjunctiva which extends on to the cornea from the outer or inner side of the eyeball is called a pterygium. It usually occurs in elderly people, especially those exposed to much irritation of the eyes by cold winds, dust, etc. It can be removed by operation.

PTOMAINE. An alkaloidal substance produced by the action of putrefactive bacteria on protein food, a ptomaine was at one time considered to be the main cause in all cases of food poisoning. It is now recognized that in most cases of poisoning from this source a disease-producing microbe is responsible, and that the poisonous toxins are produced actually within the body, and are not often ptomaines. Ptomaines, if absorbed into the blood, cause symptoms of poisoning, which is referred to as sapraemia, but few ptomaines are poisonous when taken by the mouth. A poisonous ptomaine may, however, occur in cheese, ice-cream and some other foodstuffs, the usual symptoms being those of irritant poisoning. *See* Botulism ; Food ; Poisoning.

PUERPERIUM. After childbirth the womb, which has been much enlarged for the reception of the child, must return to ordinary dimensions. The period during which this is taking place is called the puerperium, and lasts for six weeks at least. Till the lining of the womb has resumed its ordinary condition more or less, a discharge, known as the lochia, continues. In the first three days following labour this is reddish in colour, and then for three or four days longer it is watery. If the redness continues it suggests the retention of a piece of after-birth, clot or membrane in the womb. If the discharge suddenly ceases, puerperal infection should be suspected.

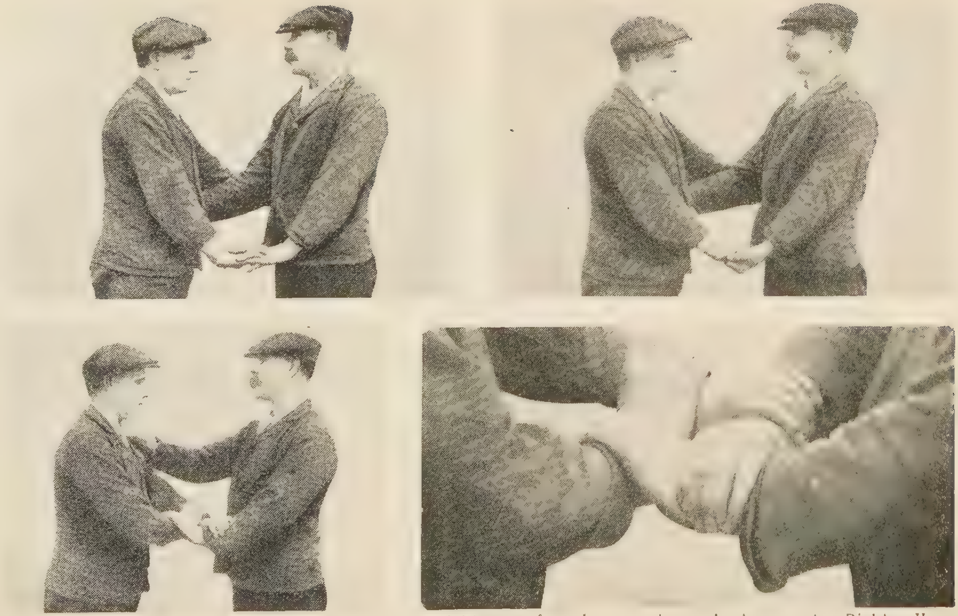
The greatest care must be taken to keep the private parts thoroughly clean, lysol solution, a teaspoonful to the pint, being used for sponging. No soiled diapers or clothing should be allowed to remain in the room. Particular care should be shown in cleaning the teeth and mouth, as a septic mouth may cause puerperal infection. Diet for the first day or two should be light. On the third day a dose of opening medicine, castor oil or liquorice powder, is given, and afterwards the diet should be more liberal. The patient should remain in bed for ten days at least. During the next fortnight she should lie down from time to time, and avoid any exertion. Bleeding in the 24 hours after labour is called post-partum haemorrhage, and after this time puerperal haemorrhage. Its first aid treatment is given under the heading Flooding, but a doctor should be summoned at once.

There is a considerable risk of infection during the puerperium, especially the earlier part, and for the first two or three weeks the temperature should be taken at least night and morning. Fever due to septic infection at this time is called puerperal fever, but it may take several forms. The placenta, etc., retained in the womb may putrefy, and the products of bacterial action may be absorbed into the blood, causing a condition described as sapraemia. The fever in this condition is likely to



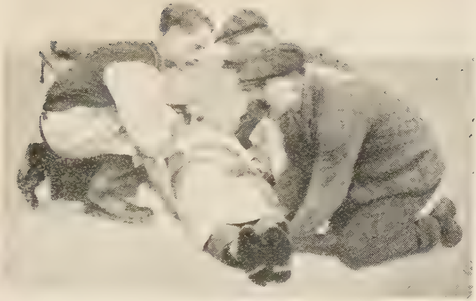
Children receiving a lesson in teeth cleaning at a dental clinic in Vienna. Centre. Youngsters at the same clinic spitting out the mouth wash after gargling. Top left: Vertical brushing, the best method of cleaning the teeth. Top right: Keeping adjoining tooth surfaces cleaned by drawing a thread of dental floss between

LESSONS IN CLEANING THE TEETH

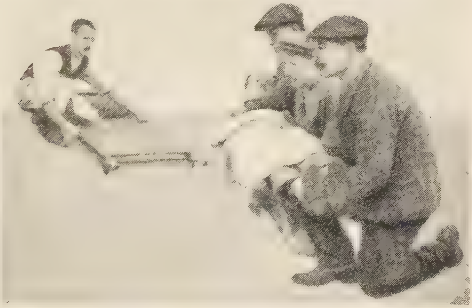


Left. Method of forming a three-handed seat, the right arm of one bearer acts as a back support. Right. How to make a four-handed seat. Above. Two methods of forming a two-handed seat. Left. Locked fingers. Right. The hook grip

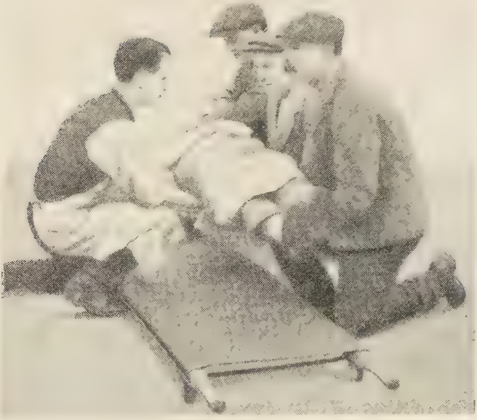
IMPROVISED SEATS FOR THE INJURED



Left. Preparing to place a helpless patient on a stretcher

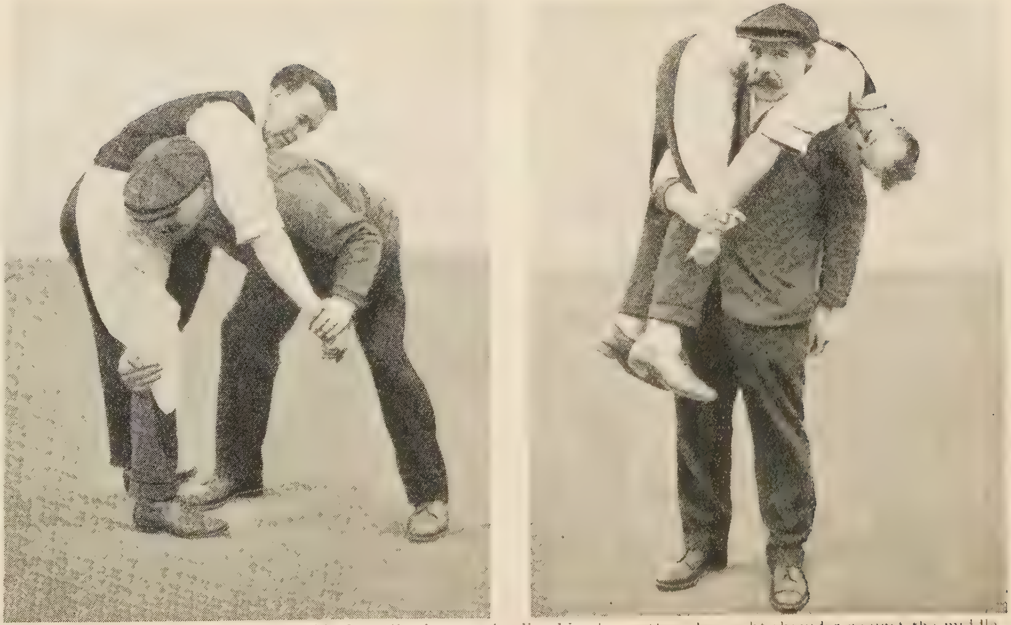


Right. Patient placed on the right knees of three bearers while the fourth brings the stretcher



Left. The stretcher is placed in position and the fourth bearer helps to lower the patient

TRANSPORT OF THE SICK AND INJURED



Left. After raising the patient to his feet, the bearer steadies him by putting his right shoulder against the middle of the patient's body and taking the right arm of the patient round his neck. The bearer then puts his right arm round the patient's right thigh. Right. The bearer then rises to the erect position and grasps the right wrist of the patient with his own right hand. In the case of a woman the right arm is put round both the lower limbs

CARRYING THE INJURED: METHOD KNOWN AS THE FIREMAN'S LIFT

begin early, perhaps from the third to the fifth day. In puerperal septicaemia there are bacteria actually circulating in the blood. The onset of fever may be gradual, but often is sudden and accompanied by rigor. The fever is high, possibly with delirium, and there may be sickness and vomiting. Similar symptoms occur in puerperal pyaemia. Another form of infection is inflammation of the bladder (q.v.), or cystitis. Others are parametritis (q.v.) and perimetritis (q.v.), which usually occur in the second week, as does also white leg (q.v.).

Puerperal fever is a notifiable disease, and immediate medical supervision of treatment is required. Sometimes douching is depended on to remove infection from the passages, but at other times more energetic and thorough measures are necessary. Otherwise the treatment is mainly that of fever (q.v.). *See* After-birth ; Breast-feeding ; Childbirth ; Womb.

PULSATION. A throbbing caused by the beating of the heart is called a pulsation. Visible pulsation in arteries may mean an aneurysm, but more often it does not. What is called epigastric pulsation, that is, a throbbing in the pit of the stomach, is common in thin individuals, and in persons who have been doing hard and prolonged mental labour, and in neurotic persons. Pulsation in the neck is common in anaemia. *See* Heart ; Pulse.

PULSE. Each beat of the heart sends a wave of expansion along the arteries. The artery usually selected for the examination of the pulse is the radial, where it lies just beneath the skin and over the radius bone a little distance above the wrist. When examining the pulse, a doctor notes its rate, its regularity, its force, the blood pressure and the state of the vessel-wall. The rate is usually that of the heart-beat, and in an adult is 72 beats per minute, but in some healthy people the rate is constantly slower or faster than this. In the early weeks of life the rate is 120 to 140, and it gets progressively slower as the child grows older. The pulse rate is increased by exertion. After brisk exercise, such as running upstairs, the rate should return to the ordinary one within about two minutes at most. The rate is also increased by excitement and by a full meal. It is increased in many diseases. In fever the increase is usually about 8 to 10 beats for every degree of fever. Undue rapidity of the pulse is called tachycardia, undue slowness, bradycardia.

The normal pulse is regular, the beats being of the same size and occurring at the same intervals of time. As a rule, and especially in children, the pulse is faster when air is being inhaled and slows down while it is being exhaled. The serious disorder called auricular fibrillation produces a pulse which is altogether irregular. The force of the pulse-beat may vary. In conditions associated with great physical depression, it may have what is called a thready character. *See* Blood Pressure ; Heart.

PUPIL. The round, black opening in the centre of the iris, or coloured curtain of the eye, is called the pupil. If the iris is drawn outwards, the pupil enlarges or dilates ; if the iris, on the other hand, moves inwards, the pupil becomes smaller, or contracts. It contracts when the eye is exposed to light—the light-reflex, and also when a near object is looked at—the accommodation-reflex. When the latter reflex exists, but there is no response to light, what is called the Argyll-Robertson pupil is said to be present. It occurs most frequently in locomotor ataxia.

PURGATIVE. *See* Cathartic.

PURPURA. Bleeding into the skin is described as purpura. The marks on the skin are red at first, then become purple, and finally brown or yellow. At no time can they be removed by pressure, and this fact distinguishes the condition from that of erythema (q.v.). The marks vary in shape and size. Such patches may be due to insect bites, to sprains or other injuries, to poisoning by snake-bite, or by mercury or other substances, or they may occur in connexion with measles, smallpox, or some other specific fever, or with jaundice, however it may be caused. In these conditions purpura is simply a symptom, but there are several diseases in which it is the most prominent fact.

Simple purpura is a disease which mainly affects children. Small round spots called petechiae form mainly on the legs, and may run together to form large patches. There is at most a trifling constitutional disturbance. The condition clears up in one or two weeks. In rheumatic purpura, also called Schönlein's disease, the joints are also affected, and crops of petechiae appear on the legs and other parts of the body, commonly on mucous membranes as well as skin. Henoch's purpura resembles that just described, but is characterised in addition by attacks of severe pain in the abdomen with vomiting and diarrhoea. This disorder mainly affects children. Haemorrhagic purpura, or Werlhof's disease, usually occurs in young and delicate girls. There is bleeding into the skin and into mucous membranes.

The treatment of purpura is to keep the patient in bed on a light nutritious diet, the bowels being kept open. A search should be made for any source of poisoning. Calcium, iron and quinine are the drugs mostly used.

PUS. The liquid contained in an abscess is called pus. A discharge containing pus is said to be purulent. *See* Abscess.

PYAEMIA. A form of blood-poisoning, pyaemia is characterised by the fact that infected particles of thrombus, or clot, are circulating in the blood and giving rise to numerous small abscesses in various organs, notably the lungs. This may occur when there is a suppurative lesion anywhere in the body; thrombosis takes place in a vein at the site of the lesion, and, by softening of the thrombus, portions are detached and pass into the circulating blood. Symptoms of pyaemia usually occur suddenly with a chill or rigor. The fever is high and there may be vomiting, and possibly diarrhoea. After some hours the temperature falls, and there is free sweating. This occurs each day, or there may be several rigors in a day, the temperature going up and down. The patient is soon prostrated. If the lungs are affected by abscesses, there are signs of bronchitis or of consolidation, the condition found in pneumonia.

It is often impossible to locate the lesion which is the source of the poisoning, but if it can be found it is cleaned up as well as possible. Vaccines and sera are sometimes of value in fighting the infection. Otherwise, the treatment is that of fever (q.v.). Free stimulation with alcohol may be necessary, and as much light food as the patient can take should be given. *See* Embolism; Septicaemia ; Thrombosis.

PYELITIS. Inflammation of the pelvis of the kidney (q.v.) is called pyelitis.

PYORRHOEA. A chronic discharge of pus from the gums is described as pyorrhoea alveolaris, or Rigg's disease. The pus forms between the neck of a tooth and the collar of gum which surrounds it, loosening the contact of the gum with the tooth. Pockets form in the gum and exude pus, and septic inflammation spreads down the socket, softening the bone that forms it, and gradually loosening the tooth. In later stages the gum becomes very spongy and bleeds easily. Pus is constantly being swallowed, and this causes indigestion and may infect the lining of the alimentary tract somewhere. The absorption of the poisons produced by the pus-forming bacteria causes anaemia, nervous irritability, nervous exhaustion, inflammation of joints and possibly other troubles. The bacteria themselves may enter the blood and cause pyaemia (q.v.).

It should be understood that pyorrhoea may exist and damage the system while the appearance of the gums and teeth may give no hint of the condition, though an X-ray photograph will reveal it. The formation of tartar at the neck of a tooth favours the occurrence of pyorrhoea. The existence of the disease makes it necessary to wash out the mouth frequently each day, an antiseptic mouth wash (q.v.) being used for two or three of the washings. It may be necessary to have the teeth extracted. *See* Epulis ; Gum ; Teeth.

QUARANTINE. The question of quarantine, in the general experience, mostly arises in connexion with the attendance of children at school. The dates at which a convalescent or contact may return to school are noted under the headings of individual infectious diseases, but children who have actually been ill will probably require a little holiday before going back to school. The date from which the quarantine of contacts is to be calculated is that of the last exposure to infection. A certificate of fitness to attend school should be got from a doctor, both for patients and contacts. *See* Infectious Disease.

QUASSIA. Shavings or chips of quassia are used in medicine for the sake of a bitter principle which they contain. The drug is used in the form of the tincture, dose ½ to 1 drachm, and of the infusion, dose ½ to 1 oz. Quassia is used as an appetiser and in dyspepsia. A strong infusion is often used to kill threadworms, by injection into the bowel. *See* Bitters.

QUICKLIME. The oxide of calcium is commonly known as quicklime. It is used to make lime water. When quicklime gets into the eye it should be washed out with a strong solution of cane sugar or with olive oil; plain water slakes the lime and increases its caustic action. *See* Calcium.

QUILLAIA. Also known as soap bark and Panama bark, quillaia bark is sometimes used as an expectorant, its properties in this respect resembling those of senega.

QUININE. An alkaloid obtained from cinchona bark, quinine is an indispensable drug in the treatment of malaria. It is sometimes used as an antipyretic in other fevers. It may also relieve neuralgia, and, in small doses, is a bitter tonic. The salt most often employed is quinine sulphate, but the hydrochloride and the bihydrochloride of quinine are also much used, the last being the preparation chosen when quinine is to be injected into the body. The dose of each of these three salts is 1 to 2 grains as a tonic, and up to 10 grains or more for fever. When the temperature is raised, it is preferable to give quinine in solution, as in the following, which makes one dose:

Quinine sulphate	10 grains
Dilute sulphuric acid	10 minims
Syrup of lemons	1 drachm
Water	to 1 ounce

There is a tincture of quinine and an ammoniated tincture, the dose of each being $\frac{1}{2}$ to 1 drachm. The latter, commonly referred to as ammoniated quinine, is often used at the beginning of a common cold or of influenza.

Considerable doses of quinine, or even small doses, when there is an idiosyncrasy to the drug, cause symptoms of poisoning, referred to as quininism. These include ringing in the ears, headache, deafness and dimness of vision, or actual blindness. To lessen the tendency to headache and noises in the ears, quinine is often combined with dilute hydrobromic acid, as in the following prescription (one dose):

Quinine hydrochloride	10 grains
Dilute hydrobromic acid	15 minims
Simple syrup	1 drachm
Water	to 1 ounce

QUINSY. *See* Tonsil.

RABIES. *See* Hydrophobia.

RADIANT HEAT. One method of applying dry heat to the body is to use the heat radiated from electric lamps, either one large lamp or a number of small ones, arranged in rows in a special cabinet, in which the patient lies or is seated. In this way pain in rheumatism and other affections is relieved.

RADIUM. A white metallic element belonging to the group of alkaline earths, which also includes barium, calcium, magnesium and strontium, radium is found in pitch-blende and other mineral deposits. It occurs in conjunction with uranium and a heavy gas, known as radium emanation, radon or niton.

When the skin is exposed to a sufficient dosage of radium, redness, or erythema, appears in from seven to fifteen days. This may be followed by peeling. Larger doses may cause blistering also, and, larger still, ulceration, which is slow to heal. Radium is an important instrument in the treatment of malignant tumours when an operation is out of the question. It is sometimes used in the area of operation after the removal of such a tumour so that isolated small portions of tumour tissue which might chance to be present would be killed. It is also used in treating some kinds of birth mark, keloid, lupus and other chronic skin diseases. Some cases of chronic joint disease have benefited considerably from drinking water containing a measured dose of radon.

Radium is generally used in the form of one of its salts, as such are more stable than the element itself. Different kinds of tubes are used for inserting radium into body cavities and tumour tissue, including platinum needles and tiny glass tubes, known as "seeds," which are filled with radon. These seeds are permanently buried in tumour tissues.

RADIUS. The bone on the outer or thumb side of the forearm is called the radius. At the elbow it articulates with the humerus, and its lower end, which is more massive than the upper, takes a much larger share than the ulna, the other bone of the forearm, in forming the wrist joint. The radius articulates with the ulna at both its extremities.

A fracture through the lower end of the radius is known as Colles' fracture. It most often occurs from falling on the palm of the hand with the arm stretched out. The hand is drawn towards the thumb side, and there is a swelling on the back of the wrist and another on the front, below which there is a notable depression. The first-aid treatment of fractures of the radius is described under the heading Fracture.

The radial artery is the outer of the two branches into which the brachial artery divides. It crosses the forearm obliquely, beneath the muscles, until at the wrist it lies in front of and on the lower end of the radius. The name radial nerve is used in two senses. It may apply to a branch of the musculo-spiral nerve which is distributed to the skin on the radial side of the back of the hand, but is more often used for the whole musculo-spiral nerve. *See* Elbow; Ulna; Wrist.

RÂLE. When listening over a healthy lung, sounds caused by the inflow and outflow of air are heard. If, from disease, the air tubes or the air cells of the lungs should be occupied by liquid substances, or if abnormal cavities containing fluid exist in the lung, additional or adventitious sounds occur, caused by the flow of the air through the liquid, and described as râles. They may have a clicking, crackling or bubbling character.

RANULA. A small cystic swelling in the floor of the mouth, beneath the forepart of the tongue, a ranula is generally due to blocking of the duct of one of the sublingual salivary glands. Occasionally the obstruction is caused by a salivary calculus.

RASH. An eruption, or rash, is a breaking-out on the skin and perhaps mucous membranes also. It may consist merely of redness or there may be papules, vesicles, pustules or something else. It is important to recognize the primary lesion or essential feature of a rash, as later on there may be obscuring of the real nature of the condition by the effects of scratching, infection, etc. A rash may be due to one of the specific fevers in which case it usually occurs at a definite time after the onset of the illness. It has a more or less characteristic appearance and distribution on the body, and is accompanied by other symptoms which may help towards recognition of the disorder.

A rash may also be due to taking some drug, and here again the appearance may be suggestive. Antipyrine, bromides, iodides, copaiba and arsenic, for example, produce fairly typical skin eruptions. Sometimes a rash is due to auto-intoxication, the absorption of poison from the bowel or some other source within the body. Syphilis, tuberculosis and other infections may cause a rash, and this may be acute or chronic. External irritation from lice and other parasites, from chemical or mechanical irritants or from the sun, is another possible cause. Finally, a rash may represent some skin disease. *See* Infectious Disease; Skin; and under the headings of diseases.

RAT. In Europe the brown rat is the prevalent type, having displaced the black rat, which still abounds in India and elsewhere in the East. The black rat haunts human dwellings, but the brown variety prefers to live in sewers and elsewhere underground. A female rat begins to breed at the age of three to four months, has five or six or more litters in a year, and in each of these there may be ten to fourteen or more young. It has been estimated that in Great Britain the annual bill for foodstuffs consumed or destroyed by rats amounts to about £52,000,000, and beyond this there is damage to other kinds of merchandise, to buildings, and to fowls. In addition, rats play a considerable part in disseminating disease, the disorders which may be attributable to their agency including rat-bite fever, haemorrhagic jaundice, plague, ringworm, foot-and-mouth disease, and a virulent form of equine influenza. The destruction of rats about one's premises is a legal duty, enforceable by a penalty. Methods of exterminating them may be ascertained from the local medical officer of health. *See* Flea; Plague.

RAT-BITE FEVER. The bite of a rat is sometimes followed by a disorder described as rat-bite fever. This is caused by a spirillum, a micro-organism, which is inoculated by the bite. The wound apparently heals, but after an interval of some weeks or months, it becomes inflamed and fever begins suddenly, often with a rigor. The temperature may range between 102° and 106° F. With the onset of fever a rash appears, and there is pain in muscles and joints. Treatment with organic arsenical preparations, like salvarsan, is successful in destroying the infection. Otherwise the treatment is that of fever (q.v.).

RAYNAUD'S DISEASE. The disorder which passes by the name of Raynaud's disease is characterised by a disturbance of the circulation in various parts, especially the fingers and toes. The effects of this disturbance may vary, and three degrees are recognized. The first is that popularly known as dead fingers, in which the fingers become white and waxy-looking and feel numb. This state may persist from a few minutes to many hours and then the proper circulation is re-established, probably with sensations of tingling and pricking. The second degree is one in which the fingers are blue, cold and somewhat swollen from stagnation of blood in the smaller veins. This condition is usually more persistent than the former one, and it may be associated with severe pain and much tenderness in the affected parts. When the circulation is becoming re-established the parts are red, hot and probably painful. The third stage is that of gangrene (q.v.) or death of pieces of tissue.

Raynaud's disease is more frequent in females and generally begins in the age-period between fifteen and thirty. Heredity is a fairly common factor in causing it, but the liability to the disease may be acquired, numbers of cases occurring, for example, after some acute illness. Others follow mental shock and worry. Cold is the immediate cause, and affected persons suffer most in the winter. A tendency to exhibit Raynaud's symptoms should be countered, if possible, by warm clothing during the colder weather, warm and roomy gloves and boots being worn. The use of calcium lactate, nitro-glycerin or sodium nitrite may be serviceable in some cases, and in most it is desirable to take cod-liver oil throughout the winter. Neither cold nor hot water should be used for washing. Friction, with or without a stimulating liniment, may be used to restore the circulation, but if there is much tenderness all that may be possible is to wrap up the parts in cotton wool. Galvanism and exposure to ultra-violet rays are additional kinds of treatment. *See* Circulation of the Blood; Cyanosis; Gangrene.

RECTAL DOUCHE. An ordinary enema (q.v.) apparatus can be used for washing out the bowel, the injection being made slowly so that as large a quantity of liquid as possible may be introduced into the bowel. The patient lies on the left side with the hips somewhat raised. Rectal douching is specially associated with the treatment at the Plombières spa, in France, but treatment such as is carried out there may be obtained at any British spa. *See* Douche; Rectum.

RECTAL FEEDING. When feeding by the mouth is impossible or highly undesirable, an attempt may be made to get food into the system by nutrient enemata, or injections of liquid foods into the rectum. Each injection should not exceed 3 oz, and no more than four injections should be given in the 24 hours. The ingredients may include glucose and milk that has been peptonised for 24 hours. Rectal feeding cannot be carried on indefinitely.

RECTUM. The lowest part of the bowel is called the rectum, and is rather over 6 in. in length. It extends from the end of the sigmoid flexure of bowel to the anus, and lies entirely within the pelvis. The lower end of the rectum is surrounded by two sphincter, or closing, muscles, the internal and the external anal sphincters. In the lower part of the rectum there is an arterial plexus, or network, and a corresponding venous plexus; the blood from this drains partly into the portal vein and for the rest into the inferior vena cava. The connexion with the portal vein explains the frequency of piles when there is congestion of the liver.

DISEASES OF THE RECTUM. Inflammation of the rectum, or proctitis, may be caused by the presence of threadworms, of piles or of a polypus, or by dysentery or some other infection. It causes straining, and the faeces contain mucus, mixed, perhaps, with pus or blood, or both. The source of irritation must be removed, the bowels kept freely open with laxatives, and sedative enemata administered. From chronic proctitis, associated with syphilis and numerous other causes, stricture of the rectum may arise, interfering with emptying of the bowel, and leading to the chain of symptoms caused by chronic obstruction (q.v.)

When there is chronic straining there is a tendency to the occurrence of prolapse of the rectum. Here, again, the source of irritation must be removed. After a motion, the bowel is washed and gently replaced, being kept in position by a pad and a T-bandage. An operation may become necessary, however. The commonest tumours of the rectum are polypus, which occurs most often in children, and cancer, which is found in adults. A polypus causes irritation, straining, and perhaps the presence of blood and mucus in the stools. It should be removed by operation, a simple matter as a rule.

Cancer is insidious in its onset and course, and often is far advanced before it is discovered. In the early stages it may cause a little irritation and straining, but later these symptoms become pronounced, and there are signs of partial obstruction. From an early stage a little blood may be present in the stool; this is often ascribed merely to the existence of piles. Pain hardly occurs till late in the disease. The growth must be extirpated by an operation. If the disease has gone beyond an operable stage, radium may be of some use as a palliative measure. *See* Anus; Constipation; Intestine; Obstruction; Piles; Tenesmus.

REDUCTION. In surgery the replacement of broken or dislocated bones into a correct position is called reduction, as also pushing back the contents of a hernial sac into their proper position. *See* Dislocation; Fracture; Hernia.

REFLEX ACTION. When the sole of the foot is tickled the foot is drawn away. This occurs independently of the will and is an example of a reflex action. The irritation of the skin causes a nerve stimulus to pass up to a centre in the spinal cord, which in turn liberates stimuli to cause contraction of the muscles required to drag the foot away. The knee jerk, which is caused by tapping the patellar tendon, is an example of what is called a deep reflex in contrast with a superficial reflex, which is caused by irritation of the skin. Both depend on the integrity of the afferent route, the centre on the cord and the efferent route, and both are exaggerated if the path from the brain to the spinal centre is blocked, thus cutting off control by the will. *See* Knee Jerk; Nervous System.

RELAPSING FEVER. Under the general name of relapsing fever is included a group of fevers caused by species of spirochaeta, a slender, thread-like micro-organism with a wavy outline, the disorders being characterised by recurring bouts of fever lasting for several days and separated by apyrexial periods of about the same duration. In Europe the disease is caused by spirochaeta obermeieri, or recurrentis, and this is conveyed by the louse, inoculation taking place through scratches on the skin.

The incubation period is on the average from five to seven days and the fever begins suddenly with chills and rigors, the temperature shooting up to about 104° F., remaining high with slight remissions for five to seven days as a rule. There is severe headache, pain in the muscles and probably also in joints. At the end of the time mentioned the fever declines by crisis. In a few hours the patient feels well and may wish to get up. He remains well till about the fourteenth day from the beginning of the disease, when he has another attack of fever, similar to the first but of shorter duration. Subsequent relapses may occur.

Relapsing fever is a notifiable disease. Preventive treatment consists in vigorous measures to destroy lice and other carriers of the disease. The infection may be destroyed by administering one of the organic arsenical preparations of the salvarsan type, otherwise treatment is largely that of the state of fever. Heart stimulants are often necessary. *See* Fever; Infectious Disease.

RELAXED THROAT. Chronic pharyngitis is often referred to as relaxed throat. *See* Pharynx.

RESORCIN. A white crystalline substance, obtained from benzene, resorcin acts as an antiseptic and antipyretic. When applied to unhealthy skin it aids materially in removing the unhealthy cells and in promoting a sound growth. It is consequently much used in skin diseases. In acne a preparation, consisting of 15 grains in an ounce of Lassar's paste is useful. In seborrhoea of the face a lotion made by dissolving 10 grains or more in an ounce of spirit is sometimes used, and also for dandruff. Weak solutions of resorcin are used as antiseptic lotions. Resorcin is not often given internally, as it is poisonous.

RESPIRATION. In respiration or breathing, air is alternately drawn into the lungs and expelled from them. The drawing-in of air, or inspiration, is accomplished by the capacity of the chest being increased by the descent of the midriff, or diaphragm, and the elevation of the ribs. The flattening of the dome of the diaphragm increases the vertical diameter of the chest, the ascent of the ribs its antero-posterior diameter, and, owing to the elasticity of the ribs, there is also some increase in the transverse diameter when they are raised. The chest is an airtight cavity, except for the respiratory passages, and when its capacity is increased air is bound to rush into the lungs, which expand to fill up the increased space. At the end of inspiration the muscles which produce it relax, the diaphragm again rises, and the ribs fall. Consequently, air is forced out of the lungs, or, in other words, expiration takes place. As compared with air that is inspired, that which is expired contains less oxygen, more carbonic acid gas, and more watery vapour; it is also warmer. Blood carries the oxygen to the tissues, to which it gives it up, and removes from them carbonic acid gas, which is a waste product.

The quantity of air which is passing in and out during ordinary breathing, and which is called the tidal air, measures about 30 cubic in. in a healthy adult man. By taking a full breath, about 100 cubic in. of additional, or complemental, air can be inspired, and, on the other hand, by a forcible expiration during ordinary breathing an additional 100 cubic in. of air can be expelled. This is called the supplemental air. The lungs cannot be quite emptied of air; there always remains after the fullest expiration about 100 cubic in. of residual air. The total amount of air that can be taken into the chest by a full breath and expelled by a deep expiration amounts to about 230 cubic in. This is sometimes called the vital capacity. Normally the movement of inspiration lasts somewhat longer than that of expiration. The combined movements of respiration occur about eighteen times per minute.

Cessation of breathing is called apnoea. It occurs, for example, after deep breathing for a minute or two, and lasts for a short time. It also occurs in Cheyne-Stokes breathing, in which the respiratory movements gradually increase in extent up to a point and then gradually decline. This type of breathing may occur in apoplexy, and other disorders. Difficulty in breathing is called dyspnoea. *See* Artificial Respiration; Asphyxia; Breathing Exercises; Circulation; Lung; Shortness of Breath.

REST. All the working tissues of the body must have rest if they are to carry on their duties efficiently. Even the heart, which apparently goes on beating uninterruptedly for years, has a period of rest in each beat-cycle, a period which is ordinarily quite sufficient for its needs. The main object of rest in the case of muscle is to enable it to get rid of waste products resulting from its activities. Rest is an all-important part of the treatment of acute inflammatory and of febrile disorders. It is an important factor in promoting the repair of injuries. When a patient is ordered complete rest this implies rest of mind as well as of body, and worries and excitement should be avoided as far as possible. A rest-cure means treatment on the lines of the Weir-Mitchell treatment (q.v.). *See* Exercise; Fatigue.

RESTLESSNESS. While restlessness in a child usually is a perfectly natural thing, it is not so in young infants and some cause for it should be sought out. It may be induced by many causes, including too much fussing and excitement, discomfort from clothing, teething, indigestion, constipation, rickets and so on. Even in older children restlessness may be abnormal in degree, and the possibility of the existence of chorea or some other disorder should be considered. The presence of adenoids is a common cause of restlessness at night. In adults an unusual restlessness may mark the beginning of some mental disorder.

RETINA. *See* Eye.

RHATANY. *See* Krameria.

RHEUMATISM. Acute rheumatism, or rheumatic fever, is a disease with distinctive characteristics, but the terms rheumatism, rheumatic and rheumatoid are applied to disorders which have little or no connexion with acute rheumatism, a fact which should be borne in mind when considering such disorders. Acute rheumatism is an infective disease caused probably by a streptococcus, the route of entrance to the body being by way of the throat or the naso-pharynx. Children and young adults are mostly affected. Dampness in the home and the existence of sepsis in the tonsils are factors which strongly favour the occurrence of acute rheumatism. One attack predisposes to others.

The onset of an attack is usually sudden, with fever and pain, redness and swelling of one of the large joints—the knee, elbow, wrist or ankle. Other large joints are soon affected, the pain disappearing from one as another becomes involved. The affected joint is very tender. There is profuse sweating. Often crops of small, glistening blisters form on the skin. The fever may be high, but, as a rule, there is no delirium, unless hyperpyrexia should occur. In about half the number of those who suffer from acute rheumatism there is inflammation of the lining of the heart, or endocarditis (q.v.). Sometimes there is pericarditis as well, or this may occur independently; sometimes there is pleurisy. In some cases, especially in children, little firm, painless swellings occur beneath the skin over tendons or bones. These are called rheumatic nodules, and vary in size from a pin head to large pea.

When the symptoms are less severe than in the above description, rheumatism is said to be subacute. There are slighter cases still which are often neglected because they are considered to be "growing pains," in ignorance of the fact that healthy growth causes no pain. In other instances acute rheumatism occurs simply in the form of sore throat, and in others the most prominent symptoms are those of chorea, or St. Vitus's dance. It cannot be too strongly emphasised that there is the same risk of involvement of the heart in the slighter forms of acute rheumatism as in the typical disease. The after-effects of acute rheumatism may be very serious, from the effects on the heart, but as regards the joints complete recovery is to be expected.

A person who suffers from acute rheumatism should be kept absolutely in bed, however slight the disease may appear to be, not getting out of bed on any pretext whatever. He should lie between blankets and wear a flannel nightdress which opens down the front and down the sleeves, so that it can be readily taken off; this is of great importance when the patient is sweating freely. The general treatment is that of fever (q.v.), but a thorough course of salicylates must be administered. The joints should be covered with cotton wool, and it is desirable also to smear them with methyl salicylate. Rest for a joint can be secured by a splint (*see* Plate 51). Complications are treated as described under individual headings. The patient, especially if a child, should be seen by a doctor from time to time for some years after an attack of acute rheumatism.

The so-called chronic rheumatism is a disease which affects adults, especially those whose occupations expose them to cold and damp. The joints may become stiff and painful, and more or less swollen. Another form is called muscular rheumatism. All these cases are instances of fibrositis (q.v.), and should be treated as such. A condition described as rheumatic gout is rheumatoid arthritis when it is not true gout, and in neither case has any connexion with rheumatism. *See* Endocarditis; Fibrositis; Guaiacum; Heart.

RHEUMATOID ARTHRITIS. The name rheumatoid arthritis is applied to more than one kind of chronic inflammation of joints. In one type there are no bony changes in the joints, but swelling of the synovial membrane and the soft tissues round the joint. These become contracted, and may thus cause more or less fixation of the joint, probably in a bad position. In another type, although there is first of all synovitis, bony changes appear early. The cartilage on the ends of the bones softens and disappears, and at a later stage the exposed bone may become smooth and polished. Frequently there are ridges on one bony surface which fit into grooves on another with which it comes into contact. The bone at the margins of the joint also becomes prominent or lipped. In some cases bony ankylosis of the joint occurs. These changes are similar to those found in osteoarthritis (q.v.), which, however, is a disease affecting elderly people, whereas the victims of rheumatoid arthritis are usually between twenty and forty when the disease begins.

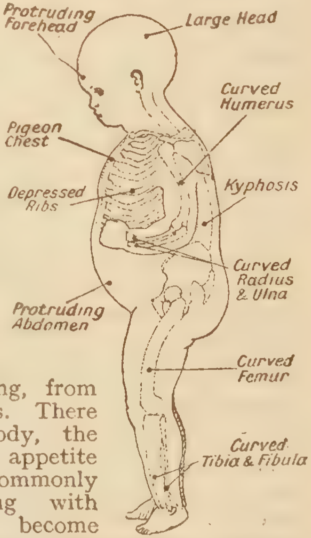
Rheumatoid arthritis occurs in a series of acute attacks, lasting from four to six weeks at a time. Fever is not very high and the pulse is rapid. The first joints to be affected are those just beyond the knuckles, but later joints all over the body are involved, those of the lower jaw being common ones. Deformity and disablement ensue.

The prime cause of rheumatoid arthritis is the activity of certain bacteria of low virulence. These form foci of infection, most commonly at the roots of the teeth or in the tonsils, but it may be at other situations in, or on, the body. The treatment of the disease should therefore begin with a search for some such focus and an attempt to clean it up, with, possibly, a course of vaccine treatment also. During the acute stage the patient should be kept at rest, and the affected joints should be splinted in such a position as to prevent deformity. These positions are described under the heading Joint. When, however, the acute stage has passed off, the joints are freely and fully moved by the doctor or someone under his direction. Various methods, including fomentations, baths of various kinds, diathermy and electrical treatment, are used to diminish pain and swelling. Massage, whirlpool baths and electrical stimulation are also useful in preserving the tone of the muscles. The diet should be generous, a considerable amount of red meat being allowed. *See* Joint ; Osteo-arthritis.

RHUBARB. The root-like stem, or rhizome, of various species of rhubarb contains a substance resembling cathartic acid, the active principle of senna, and also an astringent principle called rheotannic acid. Rhubarb thus acts as a purgative but is followed by some binding of the bowels. This is a useful kind of action in the event of diarrhoea, as offending matters are first swept from the bowel and the tendency to diarrhoea is then checked. The preparations of rhubarb include the powdered root, dose 15 to 30 grains for a single dose ; compound rhubarb powder, or Gregory's mixture, 10 to 60 grains ; and extract of rhubarb, 2 to 8 grains, given in a pill.

RIB. A rib, or costa, is a curved, elongated bone which is attached behind to the dorsal part of the spinal column and prolonged at its forward end into a bar of cartilage, or gristle, described as a costal cartilage. The attachment to the spine is by means of two joints which enable a rib to rotate on the spine, making a movement similar to that of the handle of a bucket. There are twelve ribs on either side, and the costal cartilages of the upper seven are directly attached to the breast bone, or sternum. These are consequently referred to as true ribs. Of the remaining five, or false ribs, the costal cartilage of each of the upper three is attached to the costal cartilage of the rib above it. The last two are not attached to other ribs, and are therefore called floating ribs. Along the lower border of each rib, on its inner side, is a groove occupied by the intercostal blood vessels and nerve. The space between two ribs is called the intercostal space, and is filled in by the external and internal intercostal muscles. Fracture of a rib may be due to direct violence, as by a blow, but more often is caused by indirect violence, by the chest being much compressed, as when a vehicle runs over the body. The first-aid treatment is described under the heading Fracture. *See* Chest ; Respiration.

RICKETS. A nutritional disease of children, rickets usually begins in the period between the sixth and the thirtieth month. An important factor in its production is the absence, or even shortage, of the supply to the tissues of a substance described as vitamin D. This vitamin, as well as the other necessary dietetic constituents of this nature, is present in sufficient quantities in the mother's milk when this is good. If, however, the mother's milk is thin, as is usual, for example, after nursing for over nine months, or if a child is fed on starchy foods, even with the addition of fat in the form of margarine, there will be starvation as regards this essential vitamin. This may apparently occur, also, if a child suffers from constant indigestion, especially if diarrhoea is present, a common result of giving starchy food, such as sopped bread, potatoes and cornflour, to a young infant.



RICKETS. Characteristics of this widespread deficiency disease

A deficiency of the anti-rhachitic vitamin is made good if the body is sufficiently exposed to ultra-violet rays, either in natural sunlight or artificially produced. The passage of the rays is arrested by clothing, however, and by ordinary window glass. The lack of active exercise in the open air seems to have some influence in causing the disease, but is a subordinate factor as compared with those mentioned.

Rickets begins insidiously, but sooner or later the child becomes restless and peevish, with a certain amount of fever and free sweating, from the head especially, when it sleeps. There is great tenderness over the body, the slightest touch being resented. The appetite and digestion are impaired, and commonly there is constipation alternating with diarrhoea. The child tends to become pot-bellied. Teething is delayed. The ends of the long bones become swollen, so that the wrists and other joints are unduly large, and there are rows of enlargements down each end of the chest in front, at the junctions of the ribs and cartilages, forming the so-called rickety rosary. The child is slow in beginning to walk, or, if it has done so, may lose the art; the muscular weakness may be so great as to suggest paralysis. As time goes on, the frontal eminences on the skull become enlarged, producing a broad, square forehead, and sometimes portions of the skull towards the back of the head become thin and papery. The bones of the legs bend causing bow leg or knock knee, and there is commonly flat foot. If the child rests much weight on the arms, these also may bend. The spine develops a hump and the walls of the chest are flattened; the breast bone may be pushed forward, a condition described as pigeon breast. Sometimes, however, particularly if there is nasal obstruction, as from adenoids, the breast bone is depressed, forming the funnel-shaped chest. Children suffering from rickets are prone to certain nervous troubles, such as convulsions, tetany, and a spasmodic type of choking, laryngismus stridulus.

It is most important to prevent rickets. This can be done by giving a child the diet, the sunshine, the fresh air and the exercise which it requires. A list of foods containing vitamin D is given under the heading Diet. When the disease actually exists, the same hygienic requirements must be satisfied but, as the child will be kept in bed for a time, the room in which it is confined should be thoroughly ventilated day and night. Should the weather permit, the child may be allowed to lie out of doors during the day. If natural sunlight is not available, a course of treatment by artificial ultra-violet light should be procured, if possible. Cod-liver oil is a very valuable addition to the diet, but should be given in an emulsion or with malt. The child should not be allowed to get on its feet until the bones are sufficiently strong, and to prevent its doing so it may be necessary to attach long splints to either side of the body and the corresponding limb. When tenderness has disappeared, gentle massage of the muscles should be employed. *See* Convulsions ; Diet ; Light.

RIGOR. A severe shivering fit, such as occurs in malaria and other fevers, is called a rigor. The patient at the beginning looks blue and pinched. After a short time he commences to shiver and his movements are so violent that he shakes the bed, while his teeth chatter. This goes on from a few minutes to an hour, when the patient again begins to feel warm. Notwithstanding the sensation of cold during a rigor, the temperature is actually above normal. Treatment consists in giving hot drinks and in the use of extra blankets and of hot-water bottles.

RINGWORM. Certain affections due to the presence of parasitic fungi are described as ringworm. The fungi are propagated by little round or oval bodies known as spores, and the variety of the infection depends upon the size of the spores and their situation on the body. The lesions of ringworm are commonly rounded or oval, the disease spreading out in all directions.

Ringworm may be found on the scalp, the beard, non-hairy parts of the body, and the nails. Ringworm of the body may occur in children suffering from ringworm of the head or in adults who come into close contact with domestic animals. A reddish patch forms on the skin, and as it spreads at the edges the central part tends to heal. Treatment consists in painting with tincture of iodine for three or four days and then applying an ointment consisting of 1 drachm of white precipitate ointment with soft paraffin to make 1 oz., or a similar preparation. Clothing which has come into contact with the diseased skin must be carefully disinfected. Ringworm of the beard is discussed under the heading Barber's Itch.

Ringworm of the scalp is almost entirely confined to children, usually such as are of school age. The commonest cause is microsporon audouini. In this type there are one or more patches, slightly reddened and covered with greyish scales. The hairs within the patch are lustreless and many of them are broken. In the type known as suppurative ringworm, or kerion, there are large, raised patches from which pus exudes at many points. In a third type, known as black dot ringworm, there are bald patches resembling those found in the variety of baldness (q.v.) called alopecia areata, but the scalp within the areas is stippled over with small, black dots, representing hair stumps.

As regards treatment, kerion tends to cure itself, the suppuration loosening the hairs and causing them to fall out. The patch should be painted with tincture of iodine. Epilation can be accomplished in other forms of ringworm by exposure to X-rays, though this should be at the hands of an expert. When the hairs come away they bring the infection with them. When X-ray treatment is not available, the scalp should be shaved weekly, though if there is only one patch it may suffice to shave this and for about half an inch around it, while the remaining hair is clipped very short. The patches then have a colourless iodine ointment, such as unguentum iodo denigrescens, B.P.C., rubbed into them daily. This treatment must be continued for a long time. The patient should wear a cotton cap which is frequently disinfected by boiling, and should on no account use brushes or towels common to the household. Other children in the house should have their hair clipped short, and it is a useful precaution to rub the colourless iodine ointment into their heads.

Ringworm of the nail may be due to extension from the hand or to handling other affected parts, being not uncommon, for this reason, in nurses. The only treatment is to remove the nail and kill the parasite in the nail-bed by painting with tincture of iodine. *See* Barber's Itch; Favus; Sycosis.

RODENT ULCER. The usual site of a rodent ulcer, which is a variety of cancer, is the face, particularly in the neighbourhood of the root of the nose or the scalp. It is uncommon before the age of forty. It begins as a reddish papule which is paler on the top and perhaps scaly, but before long an ulcer forms, and this, in course of time, spreads outwards and also deeply into the tissues. Its progress is slow, however, and it differs from other varieties of cancer in showing no liability to infect neighbouring lymphatic glands or distant organs. Rodent ulcer can usually be treated very successfully with radium, and also with X-rays. If quite small, it may be possible to effect a cure by means of cauterisation, carbonic acid snow, or diathermy.

ROSEMARY. Oil of rosemary is used externally, as a rubefacient, in an ointment or, as the spirit of rosemary, in a lotion. It is an ingredient in stimulating preparations for the hair.

RUBEFACIENT. An agent used for reddening the skin by causing dilatation of the blood vessels is called a rubefacient. The liniment of camphor is an example. *See* Counter-irritation.

RUPTURE. *See* Hernia.

SACCHARIN. A coal-tar product, saccharin or glusidum is a white, crystalline substance, mainly used as a sweetening agent. The official preparation of glusidum is 550 times sweeter than cane sugar. Saccharin is of much service as a substitute for sugar when this is harmful, as in diabetes or obesity.

SACRUM. *See* Pelvis.

ST. VITUS'S DANCE. Acute chorea, also called St. Vitus's Dance, is a nervous disorder in which there are irregular, jerky, inco-ordinated movements of voluntary muscles. It is mainly a disease of childhood, seldom beginning after the age of puberty, and is commoner in girls. In adults it is most often seen in connexion with a first pregnancy. It is more common in the lower classes, and in ill-nourished children. There is a very important connexion between chorea and acute rheumatism; one disease may be followed by the other, and either may cause inflammation of the heart and pericardium. Sometimes the disease has followed scarlet fever or some other infectious disease. In children with liability to chorea, a severe fright, eye strain, adenoids, intestinal worms or some other disturbing factor may excite the manifestations of the disease. The seat of the disease is in the masses of grey matter in the base of the brain.

As a rule the onset of chorea is insidious. A child may become awkward in handling things, peevish and irritable. Soon there are irregular jerky movements of the fingers, hands and face, which the child obviously cannot control and which, in fact, become worse when attention is drawn to them. Speech may be slow and indistinct, and there may be difficulty in chewing and swallowing. The child may become emotional and may suffer from hallucinations, while there may be weakening of the memory and other evidences of mental dullness. Except in the severest cases, choreic movements cease during sleep. Usually the disease lasts for three or four months.

A child suffering from chorea should be kept in bed, at any rate during the acute stage. The nutrition should be improved by a liberal allowance of milk, cream, eggs, broths and other liquid nourishment, with the addition of cod-liver oil if it can be digested. Sodium salicylate, aspirin or arsenic are the drugs usually given to attack the cause of the disease, while bromides, chloral and other hypnotics may be used to exercise a sedative effect and procure sleep. A daily hot bath or pack is also useful.

When the acuter stage has passed, massage may be useful, and then simple exercises to improve the co-ordination of movements. Throughout the disease the child should be as much as possible in the open air, and the sick-room should be kept well ventilated. A constant watch must be kept on the heart.

There is a form of chorea called chronic or Huntington's chorea, which usually begins between thirty and forty years of age, and in the causation of which heredity is the main factor. In this form progressive mental derangement is marked.

SALICYLIC ACID. A colourless, crystalline substance, salicylic acid is found in various plant products, including oil of wintergreen and oil of sweet birch, but it is also prepared synthetically. It is used in treating acute rheumatism, in doses of 5 to 20 grains, but usually sodium salicylate, dose 10 to 30 grains, is preferred for this purpose. Excessive dosage with these substances causes symptoms of poisoning, such as fullness in the head, noises in the ears, deafness, dimness of vision, sickness, delirium and cardiac depression. Salicylic acid assists in dissolving off the horny cells of the skin, and is used to remove corns (q.v.). *See* Aspirin; Gaultheria.

SALINE. *See* Cathartic; Normal Saline Solution.

SALISBURY DIET. Sometimes prescribed in gout, rheumatism, chronic psoriasis, obesity and in certain intestinal disorders, the Salisbury diet consists exclusively of meat and hot water. The meat, of which two or three pounds are taken daily, is minced and served as underdone little cakes. Four or five pints of hot water are taken daily. The treatment is not suitable unless the kidneys are sound. *See* Diet.

SALIVA. The saliva, or spittle, consists mainly of the secretion of the salivary glands, but receives some addition from glands in the lining of the mouth. It is a somewhat opalescent and sticky liquid, and is alkaline in reaction. It contains a ferment known as ptyalin, which converts starch into dextrine and maltose, a kind of sugar. Besides assisting digestion, saliva aids in chewing, swallowing and speaking.

A great increase in the amount of saliva is called salivation. This occurs after overdoses of mercury, for example. An agent which increases the amount of saliva is called a sialagogue, one that inhibits the secretion and causes dryness of the mouth, an antisialic. Mustard and pilocarpine are examples of the former, and belladonna an example of the latter class of remedy. *See* Eating; Digestion.

SALIVARY GLAND. There are three pairs of salivary glands, namely, the parotid, which lies in front of and below the ear; the submaxillary, behind the lower border of the body of the lower jaw; and the sublingual, in the floor of the mouth, beneath the forepart of the tongue. All secrete the ferment ptyalin. *See* Parotid Gland.

SALTS. *See* Cathartic.

SALVARSAN. An organic preparation of arsenic introduced by Ehrlich, salvarsan, which is also known as 606, arseno-benzol, arsenobillon, diarsenol and kharsivan, is chiefly used in the treatment of syphilis. It causes a rapid disappearance of the symptoms and shortens the period during which the patient is infectious, but to complete the cure of the disease mercury or bismuth are usually necessary. *See* Arsenic.

SAL VOLATILE. Aromatic spirit of ammonia, or sal volatile, is a popular remedy for faintness. It is given diluted with water.

SAND-FLY FEVER. In tropical and subtropical countries, during the hot weather, people are liable to suffer from a disease called sand-fly fever, but also known as phlebotomus fever, three-day fever, and by other names. The infective parasite is introduced into the body by the bite of a sand-fly, a minute flying insect. The incubation period is from two to eight days, and the disease begins suddenly with a rapid rise of temperature. Headache is generally severe, and there may be backache and pain in other muscles. The eyes are infected, their appearance often being referred to as pink eye. The tongue is coated and the mouth foul. The preventive treatment consists in the use of netting with a very fine mesh, 45 meshes to the square inch ; the sand-fly passes through ordinary mosquito netting quite easily. Failing this, the exposed parts of the body may be smeared with oil of citronella or some other pungent oil in soft paraffin. Rooms, especially their corners, should be sprayed with an antiseptic, and the ground around dwellings with tar, to a distance of 20 ft. The treatment is simply that of fever (q.v.).

SANTONIN. This drug is used to kill intestinal worms. It is given on an empty stomach along with castor oil or some other purgative. *See* Worm.

SAPRAEMIA. When there is a putrefying mass anywhere about the body, poisons or toxins, manufactured by the bacteria responsible for the putrefaction, may pass into the blood and circulate throughout the body. Such an occurrence is described as sapraemia. It is found most frequently in connexion with childbirth or an abortion, when blood-clot or portions of after-birth may be retained in the womb and putrefy. Usually the patient suffers from fever, often ushered in by a rigor, and there is severe headache and delirium, especially at night. There is progressive exhaustion and the typhoid state (q.v.) may be developed. Treatment consists in removing the offensive substance. The treatment otherwise is that of fever (q.v.). *See* Ptomaine ; Pyaemia ; Septicaemia.

SARCOMA. There are two kinds of cancer. One is derived from epithelial tissue and is called a carcinoma, while the other is derived from connective tissue and muscle, and is called a sarcoma. Each is what is known as a malignant tumour ; it eats into and destroys the healthy tissue by which it is surrounded, and it tends to spread to distant organs of the body. But while the chief route for the dissemination of a carcinoma is by the lymphatic vessels, and carriage through the blood is relatively uncommon, the converse holds with regard to sarcoma. Another difference is that sarcoma is not uncommon in children, while carcinoma is seldom found. An account of the different varieties of carcinoma is given under the heading Cancer.

The sacomata are classified mainly according to the shape of the cells composing the tumour. A sarcoma may occur in any part of the body, but bones and the retina are common sites. When growing in the places where it can be felt, it may appear first as a slight, painless swelling, though if growing very rapidly it may cause considerable pain. If allowed to persist a sarcoma may grow out and burst through the skin. Symptoms pointing to the spread of the growth to other organs may make their appearance. Thus, spitting of blood, breathlessness or pleural effusion would be highly suggestive of involvement of the lung. The best treatment is removal of the growth by operation, if possible, and when a limb is affected this generally means amputation. When this cannot be done, treatment by X-rays or radium may be tried. *See* Cancer ; Cell ; Tumour.

SARSAPARILLA. The dried root known as sarsaparilla has a great popular reputation as a blood purifier. There is no foundation for this claim, however, and any benefit which may be derived from so-called sarsaparilla preparations is due to other substances contained in them, such as potassium iodide.

SASSAFRAS. The dried, brown root of the ague-tree of North America has astringent, stimulating and sudorific properties. It is generally used, however, as the source of an aromatic oil, known as oil of sassafras. This substance is of service as a means of destroying head-lice. *See* Louse.

SCABIES. Better known by its popular name of the itch, scabies is a contagious disorder of the skin caused by the presence of a mite, known as the acarus, or sarcoptes, scabiei. The disease is usually contracted from a bedfellow, or by sleeping in a bed which has just been occupied by an affected person, but the parasites may be deposited on privy seats or may possibly be transferred by a common towel or some other kind of direct or indirect contact with an affected person. The female parasites, after impregnation, burrow into the skin. When the eggs hatch out, the young parasites make their way on to the skin.

There are several sites in which burrows are more likely to occur, including the inside of the fingers near the webs, the inside of the toes, the inside of the ankle and knee joints, the front of the armpit, beneath the breasts in females, and on the scrotum and penis in males. The presence of the parasite causes intense itching all over the body. The itch leads to much scratching, by which the skin is abraded, and this in turn favours infection with pus-producing bacteria. Patches of eczema may occur.

Treatment is begun by taking a hot bath, the whole body, except the head, being freely lathered with soft soap. A stiff nailbrush should be used as vigorously as possible on affected parts in order to open up the burrows. The body is then dried with a soft towel, and every inch of it below the neck is anointed freely with sulphur ointment, or, if the skin is delicate, with equal parts of sulphur and zinc ointment. If there is much eczema, the following is preferable :

Beta-naphthol	15 grains
Prepared chalk	30 grains
Green soft soap	120 grains
Soft paraffin	to 1 ounce

The patient then dresses in cotton underwear or clean night-raiment. This treatment is repeated on four successive nights, and on the fifth day a soap-and-water bath is taken, and the body is rubbed over with ordinary zinc ointment. This may have to be continued for some time to clear off any dermatitis. For children, an ointment consisting of 120 grains of sublimated sulphur and 1 oz. each of balsam of Peru and soft paraffin may be used. Sulphur should not be used on infants except on medical advice. Bed clothing and any personal clothing that has come into contact with affected skin must be thoroughly disinfected. *See* Disinfection ; Eczema.

SCALD. *See* Burn.

SCALP. The soft structures covering the cranium consist of the skin, the subcutaneous fatty layer, the aponeurosis of the occipito-frontalis muscle, a layer of loose fibrous tissue and a dense membrane, known as the epicranium. It is customary to regard the scalp as being made up of the first three layers. The scalp can be moved fairly freely by pushing it with the fingers, and some people are able to call the muscle into operation and thus move the scalp backwards and forwards. The fat beneath the skin in the scalp is not loosely packed as in most other parts of the body surface but forms a dense layer, the fat being disposed in more or less self-contained compartments. It follows that inflammation or an abscess resulting from infection of the scalp does not spread very far as a rule, but, as it is confined, the pain is all the more intense. If, however, a wound penetrates beneath the aponeurosis the infection can easily spread in the loose fibrous layer which occurs in this situation, so that almost the whole scalp might be raised off the bone by pus. Wounds of the scalp should be cleansed very carefully.

Scales coming from the scalp are described as dandruff (q.v.), and an inflammatory condition associated with dandruff is called seborrhoeic dermatitis. Cysts formed by an accumulation of secretion in sebaceous glands are fairly common on the scalp. Such a cyst is called a wen (q.v.). *See* Baldness ; Favus ; Impetigo ; Ringworm.

SCAMMONY. From scammony root is extracted a resin which acts as a powerful cathartic, producing profuse watery motions a few hours after a dose has been taken. The dose is 3 to 8 grains, in a pill or a powder. The resin is contained in the compound colocinth pill and other pills.

SCAPULA. Popularly known as the shoulder blade, the scapula is a plate of bone, somewhat triangular in shape, placed on the upper part of the back of the chest, to which it is firmly attached by powerful muscles. The bone has an inferior angle and a superior angle, but at the site of the third or external angle there is a thickened mass of bone, on which is a shallow, oval cavity, the glenoid cavity, for the head of the humerus. Projecting from the front of the mass in a forward direction is the coracoid process, a beak-like piece of bone, to which is attached one head of the biceps muscle. On the back of the scapula there is a process of bone running upwards and outwards and prolonged into the acromion process, which overhangs the shoulder joint. To this the clavicle, or collar-bone, is attached, to form the shoulder-girdle. *See* Fracture ; Shoulder.

SCAR. Repair of tissue destroyed by injury or disease can only take place in the form of a scar, or cicatrix. The gap caused by the loss of tissue is filled up by a mass of newly-formed cells, or granulation tissue, and this is converted into fibrous tissue. The granulation tissue is plentifully supplied with blood vessels, but as the transformation into fibrous tissue goes on the blood vessels are gradually squeezed out of existence, so that while a recent scar is pink in colour an old scar is white. The contraction of the fibrous tissue reduces the area of scarring to smaller dimensions than what it promises to have at first, but sometimes produces deformity, especially in the neighbourhood of joints. An overgrowth of a scar is called a keloid (q.v.).

SCARLET FEVER. A common infectious disease, scarlet fever, or scarlatina, owes its name to the vividness of its rash. Epidemics occur from time to time and children are more commonly the subjects of the disease. The specific cause seems to be a variety of streptococcus which generally enters the body through the nose and throat ; moreover, the infection is most often communicated by the secretions from those parts. Other discharges caused by the disease, such as a running from the ear, may be infective, and also scales thrown off from the patient's body during desquamation. In some instances infection appears to be conveyed by fomites, that is, things handled by the patient or which have otherwise been in close contact with the patient's body. Epidemics have sometimes been caused by milk.

The incubation period is usually about three or four days. Then the patient becomes fevered and suffers from sore throat and probably vomiting, especially if it is a child. On the second day the rash appears, first on the neck and chest but in the course of a day or two usually covering the whole body, with the exception of the skin around the mouth. The rash consists of tiny red spots, each being surrounded by an areola of pink, the general appearance of redness being caused by the enormous assemblage of such spots. The mouth and throat have also a vivid scarlet colour. Often there is much enlargement of the tonsils and perhaps one or more white or yellowish spots on their surface. The tongue is furred at the beginning of the fever and may have the appearance described as the white strawberry-tongue. In this the surface is covered with white fur, but is dotted over with red spots, due to swollen papillae projecting through the fur. Later on the fur is thrown off, leaving a clean red surface, but the redness of the papillae is of a different shade and they are still conspicuous ; this is called the red strawberry-tongue. With the appearance of the rash the temperature rises further, reaching 102° to 103° F. or more. The pulse-rate and breathing are increased more or less correspondingly. There is great thirst. The rash lasts for three or four days and then fades, the temperature also gradually declining. About seven days after the appearance of the rash peeling begins.

Several very important complications may occur. There may be inflammation of the kidneys, or nephritis. The urine becomes scanty and contains albumin and often blood, while there is oedema of the feet, ankles and face or even more generally. In view of this risk the urine should be tested periodically during the course of the disease. Another complication is otitis media, or inflammation of the middle ear. Infection passes up the Eustachian tubes from the nose and throat and commonly causes a suppurative discharge from the ear. A third complication is acute rheumatism, the larger joints being involved, and sometimes there is inflammation of the heart or of the pericardium. In some cases the throat becomes affected with diphtheria.

The general treatment of scarlet fever is that of an infectious disease (q.v.) and of the state of fever (q.v.). The mouth and throat should be kept very clean by the use of an antiseptic mouth-wash (q.v.) several times daily, and it will often be necessary to use a nasal douche as well. This should be given with great gentleness. Complications are dealt with as described under appropriate headings. So long as there is any abnormal discharge the patient remains infectious. By inoculation with a vaccine a skin reaction is obtained in persons susceptible to scarlet fever, and these can then be given a prophylactic serum or vaccine. The test is known as the Dick test. Sera are also used in treating the disease. A child may return to school two weeks after release from isolation. The quarantine period for contacts is seven days after the patient is removed.

SCIATICA. Pain along the course of the great sciatic nerve, that is, down the back of the lower limb, is described as sciatica. Usually it is caused by inflammation of the nerve. Pain resembling that of sciatica may be due to disease of the spinal cord or the vertebral column, and must be distinguished from sciatica. Pressure or other local disease may also be a cause of sciatica. Lead and alcohol, toxins from sepsis in the mouth or elsewhere in the body, the poisons of influenza and other infections, and diabetes, are possible causes of neuritis. When sciatica exists on both sides of the body diabetes may be the cause. As contributory causes, exposure to cold and damp and excessive muscular toil are of importance.

The pain may begin at the back of the hip, but sometimes there is first lumbago and then an extension of the pain downwards. The pain is very severe and is variously described as being of a burning, sharp or stabbing character. Points of definite tenderness are found at the back of the hip and knee, over the middle of the calf and on either side of the ankle. The severity of the attack may moderate in a week or two, but in a lesser degree the disorder may last for a month or two or considerably longer.

A victim of acute sciatica should rest in bed with a pillow below the knee, and the limb should be immobilised by sandbags or by a well-padded splint, reaching from the armpit to below the sole of the foot, as illustrated in Plate 52. Pain may be relieved by the application of heat from a hot-water bag or a large poultice. A hot-air bath, baths of other kinds, and diathermy, are other methods of using heat. Aspirin, sodium salicylate, quinine and phenacetin are some of the drugs used in this disorder. The introduction of drugs into the body by ionisation may be the best form of medication. Other methods of treatment are the application of fly-blisters along the course of the nerve, galvanism and other forms of electricity, and the application of ultra-violet rays. Massage should be started as soon as possible. Chronic cases of sciatica may derive much benefit from treatment at a spa. *See* Neuralgia ; Neuritis.

SCIATIC NERVE. The great sciatic nerve supplies the back of the thigh and the leg, both front and back, and contains motor and sensory fibres. It is about the thickness of the little finger and is the largest nerve in the body. The chief affection of the nerve is sciatica. The small sciatic nerve is a sensory nerve, supplying skin over the buttock, and the back of the thigh and leg as far as the middle of the calf.

SCLERODERMIA. A disease characterised by hardening of the skin, sclerodermia occurs in two forms. In one, which is very rare, it is diffuse, in the other, which is much more common, it occurs as circumscribed patches. The cause is unknown, but disorder of the thyroid gland has been associated with some cases, and thyroid gland treatment has been beneficial. Apart from thyroid extract, the treatment of sclerodermia is to give a general tonic, iron, arsenic and cod-liver oil being useful examples. Massage and passive movements should be carried out persistently. Exposure to chill must be avoided.

SCORPION BITE. The scorpion belongs to the spider class of animal. It only attacks when cornered or molested. Though it grasps with its pincers, the real damage is done by a poisonous spine in its tail. The poison injected by this spine has some resemblance to the toxin of diphtheria and may readily prove fatal to children. The treatment is the same as that for snake-bite, described under the heading Bite.

SCURF. *See* Dandruff.

SCURVY. It has long been known that scurvy, or scorbutus, can be prevented by including fresh food, especially vegetables and fruit, in the diet, and the disease is now rare, apart from war conditions. It has been found that the difference between fresh and preserved or dried food, as regards the liability to cause scurvy, consists in the absence from the latter of a complex substance called water-soluble vitamin C. Infantile scurvy, sometimes called Barlow's disease and scurvy-rickets, although it has no connexion with rickets, has occurred in infants fed exclusively on boiled or preserved milk or patent foods.

Scurvy begins insidiously with a gradual loss of strength and increasing pallor. The breath becomes offensive and the gums are soft and bleed easily. Numerous minute haemorrhages occur into the skin, and slight injuries may be followed by large extravasations of blood beneath the skin. In infantile scurvy there is great tenderness in the long bones, first in those of the legs, and the infant may scream when anyone approaches and appears to be going to touch it. The tenderness is caused by bleeding beneath the periosteum, or covering of the bones, and this also causes definite swelling of the limbs, which also may lie so motionless as to give an impression of paralysis. The gums bleed readily and teeth may fall out. The disease usually begins before the end of the first year.

The treatment of scurvy consists in giving food containing a sufficiency of vitamin C. Under the heading Diet will be found a list of foods classified according to their vitamin content. The juice of two or three lemons should also be given daily. An infant should be put on fresh milk and have a teaspoonful of orange juice three or four times a day. In all cases of scurvy an antiseptic mouth wash (q.v.) should be used. *See* Diet.

SEA SICKNESS. As a rule there is no danger to be feared from sea sickness, but if there is much retching this may have injurious results for full-blooded people, for those suffering from heart disease, for pregnant women, or for those suffering from rupture. When a sea journey is contemplated an attempt should be made to correct any dyspepsia or constipation that may exist. Various drugs, such as chloral, bromide, chloretone, and chlorobrom may be useful if taken before, and possibly after, going on board, but anything of the kind should be taken under medical guidance. A tight binder over the whole abdomen is often helpful. A person who is apprehensive of being sick should sit in a low deck-chair, either facing or with the back to the bow of the ship. The body should be kept warm with wraps, although it may be an advantage to have the breeze playing on the face. A safer position still is to lie down, preferably on the right side, and bring the knees well up towards the body. If sickness ensues ice may be sucked, or if there is much depression relief may be afforded by sipping iced champagne.

SEBACEOUS GLAND. To each of the hair follicles are attached two or more little glands which pour out an oily secretion or sebum, and are known as the sebaceous glands. The secretion greases the hairs and the superficial cells of the skin, keeping them smooth, elastic and watertight. If the duct of a gland becomes obstructed the sebum may accumulate behind the obstruction and form a sebaceous cyst or wen (q.v.). *See* Acne ; Seborrhoea.

SEBORRHOEA. An excessive secretion by the sebaceous glands is known as seborrhoea, and is likely to occur first at puberty, when there is an increased activity of all the glands of the body. The skin looks greasy, and is liable to infection by different micro-organisms and hence to a variety of skin disorders, including acne vulgaris, dandruff and dermatitis of different kinds. The commonest sites of seborrhoeic complications of this sort are the scalp, the forehead, the nose over the breastbone and between the shoulders. Seborrhoea may be diminished by living much in the open air and by a diet in which sugar, starch and fat are restricted, and there is abundance of fresh vegetables and fruit. Preparations of sulphur are used largely in treating its complications. *See* Acne; Dandruff.

SEDATIVE. An agent that lessens functional activity is called a depressant or, when it calms down excessive activity, a sedative. Certain agents, such as opium and the bromides, are general sedatives, but others have a more limited scope as a nervine, cardiac, gastric, respiratory, or other sedative.

SEIDLITZ POWDER. A saline purgative made up for taking as an effervescent drink, a seidlitz powder is the effervescent tartarated soda powder. *See* Sodium.

SENEGA. The root of senega acts as a stimulating expectorant. From it are prepared tincture of senega, dose $\frac{1}{2}$ to 1 drachm, and infusion of senega, dose $\frac{1}{2}$ to 1 oz. The drug is used in chronic bronchitis, especially when there is a copious, sticky sputum. The following cough-mixture contains senega:

Ammonium carbonate	60 grains
Compound tincture of camphor	6 drachms
Syrup of ginger	4 drachms
Infusion of senega	to 6 ounces

A tablespoonful in a little water thrice daily after food.

SENNA. The leaflets of Alexandrian and of East Indian senna contain cathartic acid and chrysarobin and have a purgative action, producing profuse, soft, but not watery stools. There is no reaction in the shape of constipation, but it is apt to cause griping unless combined with an aromatic drug. If senna is given to a nursing mother it will cause griping in the infant. Preparations include the confection, also called lenitive mixture, dose 60 to 120 grains; the syrup, dose $\frac{1}{2}$ to 2 drachms; and the compound mixture, or black draught, dose 1 to 2 oz., as a draught. Senna is likewise contained in the compound liquorice powder. Senna is sometimes taken as senna tea, which can be made by infusing three to six senna pods in a cup of boiling water and allowing to stand till cold.

SENSATION. A sensation is primarily caused by the action of a stimulus on an afferent nerve-ending, in consequence of which an impulse passes along the nerve to the cortex of the brain. Here the impulse provokes activity in nerve-cells and a mental process is initiated; there is a recognition of a certain sensation. The stimulation of the nerve-ending is associated with activities in special sense organs as regards the special senses, namely, sight, hearing, touch, taste and smell, and there are also sense organs in connexion with the endings of the afferent nerves of muscles. Different regions of the cortex of the brain (q.v.) are concerned with the various special senses.

A stimulus requires to be of a certain strength before it can be appreciated at all, and the same applies to differences in the intensity of the stimulus. Thus, while the addition of one candle to a hundred others already lighting a room might be noticeable, the addition of five to a thousand others would not be so. A definite time, referred to as the latent period, occurs between the application of a stimulus and the recognition of a sensation. The latent period is longer for some sensations than for others; it is longer for sight, for example, than it is for sound. The sensation may outlast the stimulus, a fact illustrated by the after-images which occur in vision. The various special senses are discussed under individual headings. *See* Anaesthesia; Hyperaesthesia; Paraesthesia; Spinal Cord.

SEPTICAEMIA. The form of blood-poisoning caused by bacteria gaining access to, and multiplying in, the blood is known as septicaemia. The bacteria make their way into the blood from some focus, such as an infected wound, an abscess at the root of a tooth or elsewhere, a sore throat, or a boil, etc. Occasionally septicaemia has been caused by the bite of an insect. The bacteria most commonly found in the blood in cases of septicaemia are streptococci, staphylococci and pneumococci, but gonococci, the influenza bacillus and others are sometimes found. Generally there is high fever in septicaemia, the temperature falling considerably during the night, though not reaching normal; the fall may be accompanied by profuse sweating. Often the existence of septicaemia is first notified by the occurence of a rigor. Delirium is common and there may be severe headache. There may be a red rash, perhaps with minute haemorrhages into the skin. There is progressive anaemia, and the patient may pass into the typhoid state.

Treatment consists in clearing up any infective focus that can be discovered. Sometimes the injection of antistreptococcic serum causes much benefit, and if a particular organism is cultivated from the blood an appropriate anti-serum may be useful, or a vaccine made from the organism actually present may be used. Otherwise the treatment is that of fever (q.v.) and of sleeplessness, headache or other troublesome symptoms. *See* Sapraemia; Pyaemia.

SEQUESTRUM. A piece of bone that has died and is lying loose in the tissues is called a sequestrum. *See* Necrosis.

SERUM. The clear, straw-coloured fluid left after clotting of the blood is called serum. *See* Coagulation.

SERUM THERAPY. The treatment of disease by the use of serums, or sera, which is commonly referred to as serum therapy, is based on facts observed in relation to natural processes of immunity and recovery from infectious disorders. When bacteria invade the body they discharge toxins, or poisons, but the body-cells prepare and liberate into the blood certain substances that counteract the toxins and which are therefore known as antitoxins, besides other substances that have a destructive action on the bacteria themselves. By injecting progressively increasing doses of bacterial toxins into an animal, the antitoxin for the particular toxin injected will be developed in the animal's blood, and if some of this is drawn off and the serum separated out it will contribute antitoxin to a person suffering from the disease caused by the bacteria in question.

Sera are used with benefit in diphtheria, tetanus, cerebrospinal meningitis, dysentery, streptococcal infections, such as erysipelas or scarlet fever, and pneumonia. A few sera have bactericidal properties. A serum prepared from the blood of a person recovering from an infectious disorder, and usually referred to as convalescent serum, has been of considerable use in measles. Sera are used for prophylactic as well as curative purposes. *See* Immunity ; Vaccine.

SETON. A piece of tape or lint, or a skein of thread passed under the skin and left, in order to keep up counter-irritation, is called a seton. It is sometimes used on the back of the neck to relieve an intractable headache.

SHINGLES. *See* Herpes.

SHOCK. A condition of extreme weakness which may follow an injury, especially one of a crushing nature, or an operation, is described as a surgical shock. The patient becomes pale and the skin is covered with cold perspiration, the pulse is weak and rapid, the breathing weak and irregular, and though consciousness is usually retained there is torpor or restlessness.

The treatment of shock is to lay the patient flat in bed with a low pillow or none at all, and to keep the head low by raising the foot of the bed. Several carefully protected hot-water bottles should be placed around him. Weak hot tea or coffee may be given if he can swallow, otherwise about a pint of warm coffee can be injected into the rectum, provided this is done with the minimum of disturbance. If, however, there is any possibility of bleeding going on no liquid should be given. The lighting of the room should be dimmed and absolute quiet preserved. A doctor may attempt to improve the circulation by injecting normal saline solution, containing gum arabic, into a vein. Severe mental shock presents similar features.

SHORTNESS OF BREATH. A person is said to be short of breath when the breathing is rapid and there is a sense of difficulty or distress. In some cases the heart is not disordered at all and in most instances it is a functional and not an organic disorder ; in others the shortness of breath is caused by emphysema or some other lung affection ; in others still it is anaemia. Shortness of breath in a young person may be due to adenoids ; or sometimes it points to the beginnings of consumption. It has been noted also that it is sometimes the first complaint of a person suffering from acute Bright's disease. The treatment of shortness of breath depends on its cause.

SHORT SIGHT. *See* Myopia.

SHOULDER. The roundness of the shoulder is caused by the deltoid muscle which hangs over the joint like an epaulette except that its fibres are gathered together below to be inserted into the humerus. The deltoid raises or abducts the arm as far as to make a right angle with the body, while movement above this level is brought about by the muscles that rotate the shoulder-blade, or scapula. The squareness of the shoulder is caused by the acromion process of the scapula which projects outwards over the joint, but the outer end of this process is kept up and out by the collar-bone, and if this bone is broken the shoulder sags downwards, inwards and forwards.

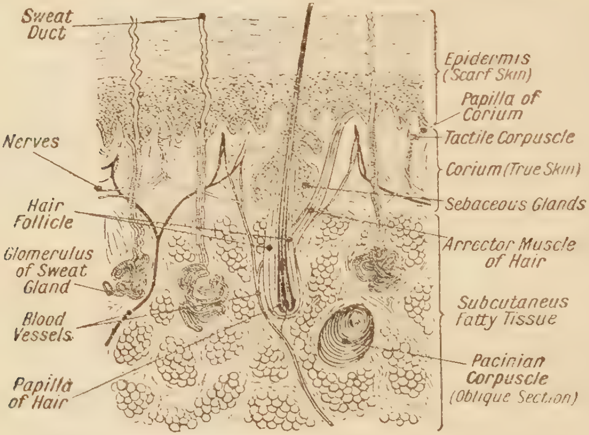
The shoulder joint is made by the head of the humerus resting in the glenoid cavity of the scapula. This cavity is very shallow, and the bones are mainly held in position by the powerful muscles that surround the joint. There is no support of this kind beneath, however, and consequently a dislocation generally occurs in this direction, the usual cause being a fall on the hand The joint is of the ball-and-socket variety. *See* Bandage ; Collar Bone ; Dislocation ; Humerus ; Joint ; Scapula.

SILVER. A metallic element, silver, or argentum, is used in medicine, chiefly in the form of its compounds silver nitrate and silver oxide, its organic compounds, or as colloidal silver. Solutions of silver nitrate of varying strength are used as lotions or injections for ophthalmia, colitis, gonorrhaea, etc. A drop or two of a solution containing 2 grains to the ounce is often put into the eyes of a new-born baby as a prophylactic measure against ophthalmia. A one per cent solution in sweet spirits of nitre is a useful remedy for eczema of the ears or about the angles of the mouth, when painted on the patches. A stick formed of fused crystals of silver nitrate is called lunar caustic and is used to destroy warts and for other purposes.

SINUS. The term sinus is used to denote a variety of spaces and passages in the body. Thus, there are the spaces in certain bones, the frontal sinus, the sphenoidal sinus and so on, and the large venous channels in the membranes of the brain. A narrow suppurating tract is also called a sinus. See Abscess.

SKIN. The skin is divided into two well-defined portions. The deeper is called the corium, dermis, cutis vera, or true skin, and consists of a dense fibrous tissue which becomes looser, however, at the level at which it merges with the subcutaneous tissue. The corium is prolonged upwards into numerous small projections, or papillae, which in the main are occupied by loops of capillary blood vessels and lymphatic capillaries. Some of the papillae are occupied by little organs concerned in the sensation of touch. The more superficial portion of the skin is called the epidermis, cuticle, or scarf skin, and is described as consisting of a deeper and a superficial layer, the former being called the rete mucosum, or Malpighian layer, and the latter the horny layer. Each consists of layers of cells superimposed one on the other. The most superficial cells of the horny layer are constantly being shed, but as constantly are replaced by new cells formed in the rete mucosum, which become more horny in character the nearer they approach the surface of the body.

The epidermis is moulded on the true skin, and shows the elevations formed by the papillae of the latter. The lines on the fingers which are so distinctive in the finger-print impressions used for identification consist of rows of these papillae.


Sweat Duct
Epidermis (Scarf Skin)
Papilla of Corium
Nerves
Tactile Corpuscle
Corium (True Skin)
Hair Follicle
Sebaceous Glands
Arrector Muscle of Hair
Glomerulus of Sweat Gland
Subcutaneus fatty Tissue
Blood Vessels
Pacinian Corpuscle (Oblique Section)
Papilla of Hair

SKIN. Its component parts seen in a highly magnified section

When a blister forms on the skin its covering includes all but the deepest layer of the epidermis. When the skin is grazed, the numerous minute bleeding points seen on the raw surface represent the tops of the papillae of the true skin. The epidermis contains no blood vessels. Two kinds of openings are found on the surface of the skin, those of the hair follicles and those of the sweat glands. To the hair follicles plain muscle fibres are attached, constituting the arrectores pilorum, little muscles which erect the hairs. Into the hair follicles open the ducts of the sebaceous glands, the oily secretion of which keeps the hairs glossy.

The skin forms a tough protective covering for the underlying tissues. It is very elastic and thus is able to stretch over tumours and other swellings and resume its ordinary dimensions when the swelling has disappeared. As a person grows older this elasticity diminishes, and thus are explained the loose folds and lines on the faces of the elderly. It is impermeable to water, but oils and fats may be absorbed. The skin is not merely a protective covering, however, but is an important sensory organ, and is also concerned in maintaining an even body temperature by regulating the loss of heat. When a considerable area of the body has been denuded of skin, as after a burn or other injury, skin grafting will often effect rapid repair.

A dull, muddy appearance of the skin may be due to constipation or indigestion, and is common in debilitating diseases. A harsh, rough surface, liable to become red, may result from too much washing with soap, especially if this contains any excess of alkali. The various abnormalities of skin structure, induced by disease, comprise macules, papules, vesicles, pustules, bullae, tubercles and scales which are described as primary lesions, and atrophy, pigmentation, sclerosis or hardening, ulceration, crusts and other lesions, which are described as being secondary; they are consequences of some primary condition. The meaning of these terms and the various skin diseases, or dermatoses, are discussed under appropriate headings. The care of the skin is dealt with under the headings Beauty Culture and Face. *See* Birth Mark; Blister; Burn; Dermatitis; Eczema; Erysipelas; Erythema; Favus; Ichthyosis; Impetigo; Itching; Lassar's Paste; Leprosy; Lichen; Lupus; Mole; Molluscum; Mycosis; Nettle-rash; Pemphigus; Pityriasis; Prickly Heat; Prurigo; Psoriasis; Ringworm; Scabies; Sweat; Wart.

SKULL. The skeleton of the head is called the skull and consists of two parts, the cranium, or brain-pan, and the face. The cranium is formed in front by the frontal bone; behind by the occipital; at the sides by the sphenoid, temporal and parietal bones; and its roof, or vault, by the frontal and parietal bones. The base of the skull is formed by the occipital, temporal, sphenoid and ethmoid bones. The occipital bone is pierced by a large opening through which the brain connects with the spinal cord. Besides this, there are numerous other openings for the passage of nerves and blood vessels. Folds of dura mater, a tough, fibrous membrane, project into the interior of the cranium forming partitions which separate portions of the brain from one another. Within these folds are channels for draining the venous blood from the skull. The bones of the face are disposed beneath the orbits, around the nasal cavities and mouth and in the cheek. The bones forming the vault of the skull of a new-born child are thin and are separated at various points to form what are called fontanelles, as shown in the illustration in page 75.

A fracture of the vault of the skull is caused by direct violence. Fracture of the base of the skull may be caused indirectly, as by a blow on the vault of the skull, or directly, as by the pressure upwards of the end of the spine when one falls on the feet or buttocks. It is generally compound, and blood appears at various points according to the situation of the fracture. Thus if in the forepart of the base, blood may pass into the orbit and the eyeball becomes reddened from below upwards, or in this situation the roof of the nose may be penetrated and blood may flow from the nose or down the throat. Further back the middle ear may be opened, causing a flow of blood from the ear. The first-aid treatment of fractures of the skull is discussed under the heading Fracture. *See* Brain; Concussion; Ethmoid Bone; Frontal Bone; Neck; Trephine.

SLEEP. A sufficiency of sleep is as essential to life as a sufficiency of food. An infant sleeps all the time except when feeding, a child of two or three years of age should sleep for 12 or 13 hours in the 24, and an adult, on the average, for 7 or 8 hours. During sleep the tissues build up their reserves of energy, and the longer sleep required in the early years of life is due to the large demands of the growth processes. These demands remain considerable throughout the whole period of growth, and to ignore them by curtailing a young person's sleep in order to accomplish cramming for an examination, or to earn a little money before going to school, is to run the risk of doing serious damage to body and mind.

During sleep the activities of the body are lessened; the heart beats more slowly, breathing is slower and shallower, the muscles, generally speaking, are relaxed and the body temperature is lowered. It is very doubtful if thought processes ever entirely cease even during the first two hours, when sleep is deepest. Probably dreaming goes on throughout, though, of course, we do not recall such dreams, but only such as occur when we are near the point of waking. *See* Insommia; Somnambulism.

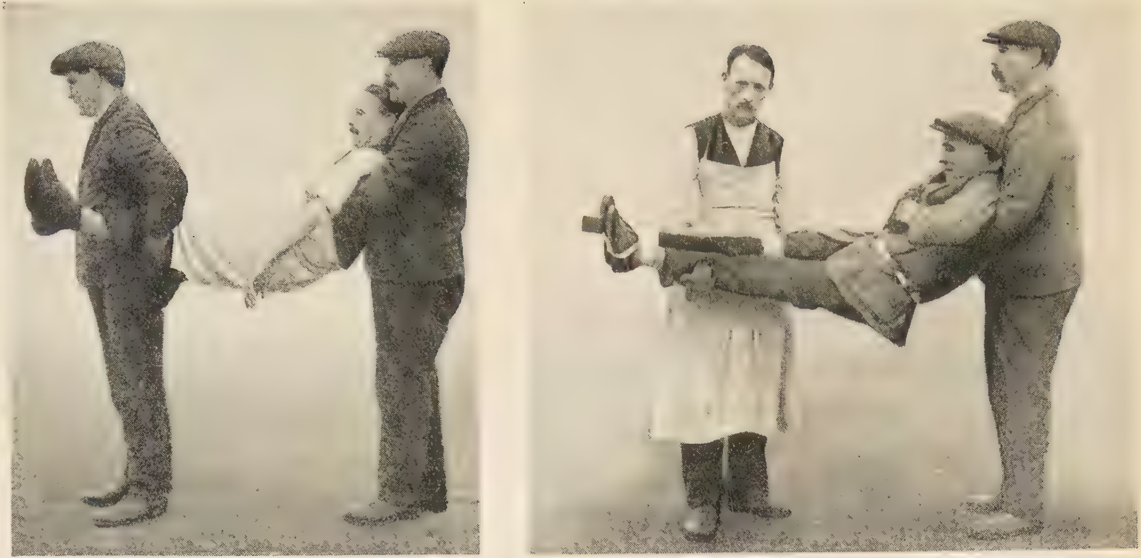
SLEEPING SICKNESS. The disease described as sleeping sickness, negro lethargy or African lethargy represents the second stage of trypanosomiasis or infection with one of the species of trypanosome, a protozoal micro-organism.

Three types of human trypanosomiasis are recognised. Two of them are found in Africa, the West African and the Rhodesian types, and these resemble one another. The third type, the South American also known as Chagas' disease presents different features. The cause of the West African type is trypanosoma gambiense which is injected by a species of tsetse fly the glossina palpalis. After an infective bite which may leave an inflamed swelling, there follows a latent period ranging from about two weeks to many months, after which the patient begins to suffer from irregular bouts of fever. Lymphatic glands over the body become enlarged, and noticeably at an early stage those about the back of the neck. This state of things may go on for months or years, the patient gradually becoming weaker, thinner and anaemic, with increasing attacks of somnolence. Meanwhile he has been wasting more rapidly and become weaker. Death may occur in a state of coma, but at any time during the course of the malady the patient may be carried off by pneumonia, dysentery or some other intercurrent disease.

The most effective remedy so far used for the disease is known as Bayer 205. Other drugs which have been used are the organic compounds of arsenic, atoxyl and tryparsamide, and sodium antimony tartrate. *See* Trypanosome.

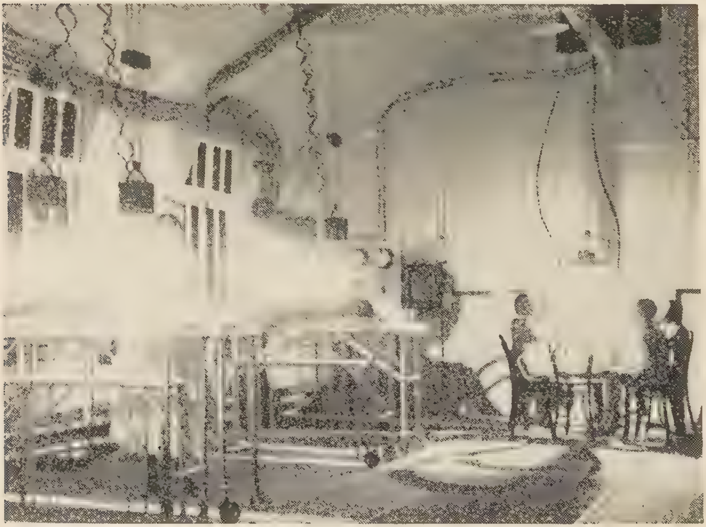
SLEEPY SICKNESS. *See* Encephalitis.

SMALLPOX. An acute infectious disease, smallpox, or variola, is now uncommon in Great Britain. The infective agent would appear to be either a minute bacterium or a protozoal organism,



Left. A helpless patient can be carried by what is known as the "fore-and-aft" method. The rear bearer passes his arms beneath the patient's arms and clasps his hands in front. Right. The "fore-and-aft" method applied to an injured leg; a splint is put on and the two legs tied together

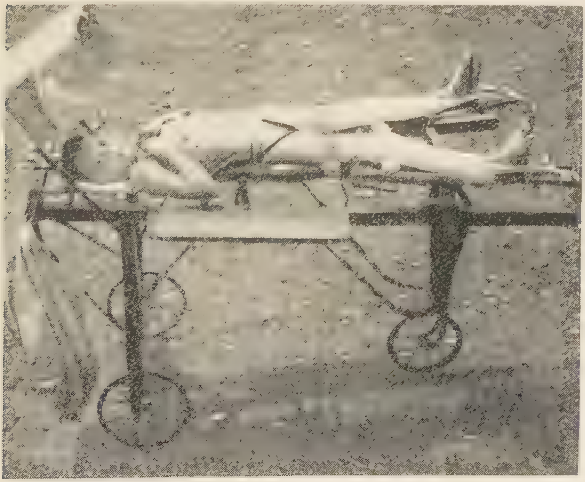
THE FORE-AND-AFT METHOD OF CARRYING AN INJURED PERSON



Light department of Cripples' Hospital and College, founded by the late Sir William Treloar at Alton, Hampshire. Here the patients are exposed to ultra-violet rays. Above. Children undergoing natural sunlight treatment

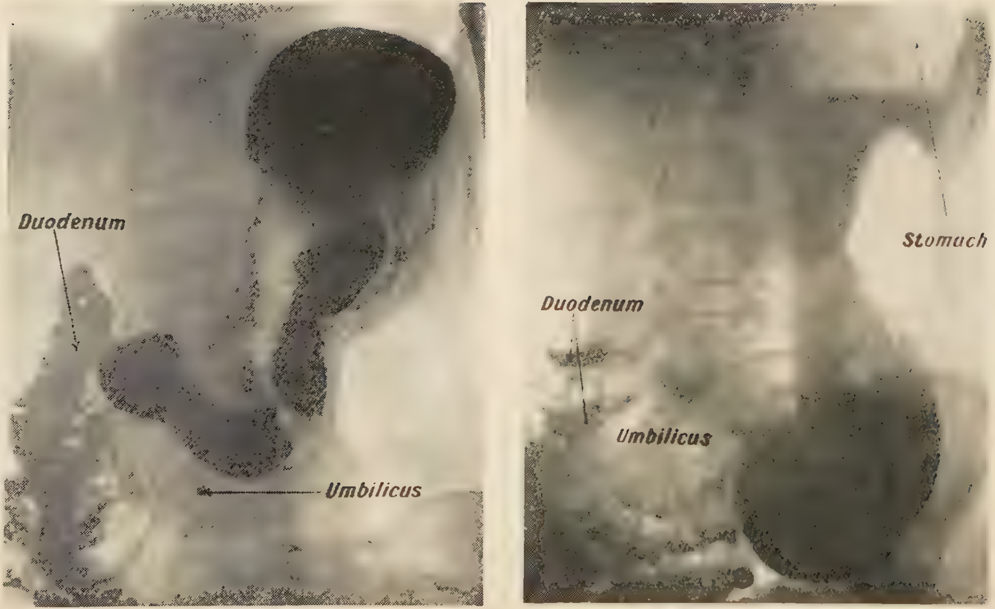
NATURAL AND ARTIFICIAL TREATMENT OF TUBERCULOSIS

Tuberculosis in all its forms except pulmonary is treated at Leysin, sun baths being applied very gradually after the patient has become acclimatized. The above photograph shows children taking the sun cure



Fresh air is a powerful recuperative in tuberculosis of the hip joint. A little patient is shown strapped to a Sir Robert Jones frame supported on a carriage

TUBERCULOSIS: TREATMENT OF A PREVALENT DISEASE


Duodenum
Umbilicus
Duodenum
Umbilicus
Stomach

Left. Radiogram taken after an opaque meal, the patient lying down, showing outline of stomach. Right. Remarkable dropping of stomach when the patient stands up, the lower end being far below the umbilicus

VISCEROPTOSIS: EFFECT OF POSTURE ON THE POSITION OF THE STOMACH and this occurs abundantly in the pustules and crusts which form in this disease. The infection is disseminated through the air, and may be carried for long distances. The incubation period is about twelve days, and then there is a sudden rise of temperature with severe headache and pain in the back, and often vomiting. On the second day there is often what is called a prodromal rash, and this commonly takes the form of reddening or erythema, a common site being the lower part of the abdomen. On the third day the rash proper makes its appearance in the form of red spots, usually on the forehead and wrist. These spots become elevated, forming papules, and the rash extends to other parts of the body. When the rash comes out, the fever is reduced, perhaps disappearing altogether.

On the sixth day the papules become converted into vesicles, or blisters, containing a fairly clear liquid. About the eighth day the contents of the vesicles become purulent, and, from absorption of poisonous matter from them, there is again a rise of temperature, this being described as secondary fever. A red zone surrounds each pustule, and there is considerable swelling of the neighbouring skin, particularly on the face. There is often also intense irritation. The temperature may be very high, and there may be much depression, the patient possibly developing the typhoid state. On the eleventh day the pustules mature, as it is called; they rupture, and their contents dry, forming blackish scabs, which gradually fall off, leaving more or less pitting. This goes on during the third week, and the temperature also generally falls by lysis.

The rash always occurs in the mouth, and may invade the larynx, so that there may be considerable swelling of the tongue and laryngitis. Broncho-pneumonia is a common complication. Conjunctivitis, or perhaps even deeper inflammation of the eyes, may occur, and may result in permanent blindness. Inflammation of the middle ear is not uncommon.

One attack of the disease usually protects against further attack, though second attacks do occur. Efficient vaccination almost always gives protection, but this diminishes in the course of years, and re-vaccination should be done at the age of ten and again in adult life. Any person who has possibly been in contact with a person suffering from the disease should be re-vaccinated, unless there has been a successful re-vaccination during the previous five years. Vaccination may even protect when it is done during the early days of the incubation period, and in any case is likely to mitigate the disease, should it develop.

The general treatment of smallpox is that of an infectious disease (q.v.). Isolation must be very strict. In order to lessen the ravages of the disease on the skin, unremitting and careful attention is required in sponging and in the application of antiseptic and sedative ointments. The quarantine period for a patient is six weeks or until free from scabs, and, for a contact, sixteen days, unless recently vaccinated. *See* Chicken-pox; Vaccination.

SMELL. The stimulus that provokes the sense of smell is caused by certain substances, in solution, coming into contact with special cells in the nose. Such substances usually enter the nose in the form of vapour. The sense of smell is easily fatigued; if one smells a perfume sufficiently long the sense for it is lost, although something else may be detected readily.

The loss of smell is described as anosmia and may be due to many causes. The most frequent one is nasal obstruction, and smell may be restored if the obstruction is removed. Atrophic changes in the lining of the nose also interfere with smell, and a victim of ozoena is himself unconscious of the foul stench emitted from his nose. Another cause is the action of tobacco or some other poison on the olfactory nerves. Loss of smell may also be a consequence of injuries to the brain, or of tumours or other diseases there. *See* Nose; Olfactory Nerve.

SMOKER'S THROAT. An habitual over-indulgence in tobacco tends to cause chronic pharyngitis. *See* Pharynx; Tobacco.

SNAKE BITE. The symptoms and treatment of the bite of an adder, which is the only poisonous snake native to Great Britain are discussed under the heading Bite. The first-aid treatment there described should be carried out for bites of foreign poisonous snakes, but in addition incisions are made through the skin over the marks of the fangs, and a strong solution oi permanganate of potassium is poured into the wounds. A serum, known as anti-venine, is injected if it is at hand.

SODIUM. A soft metallic element belonging to the alkaline group, sodium forms compounds which are wide-spread in nature, and some of which are important constituents of the body. Sodium chloride is common salt, and is an essential item in diet. It has medicinal uses also. It is used to make normal saline solution (q.v.). A pinch of salt in a glass of water makes an excellent gargle or mouth wash. A tablespoonful in a glass of water serves as an emetic. A pound of common salt in three gallons of water makes a brine bath, which is used warm to relieve pain in chronic joint disorders.

Sodium bicarbonate, or baking soda, is given in doses of 5 to 30 grains, or more as an antacid. If the dose is taken about half an hour before a meal, it stimulates digestion. Large doses of sodium bicarbonate are given in acidosis (q.v.). It helps to liquefy mucus, and a pinch in a glass of hot milk sometimes benefits a cough. A teaspoonful of sodium bicarbonate in a pint of water is often used as a lotion to relieve itching. Sodium carbonate, or washing soda, has the same actions and dosage as the bicarbonate, but is not often given, as it may prove irritating. It is used to make an alkaline bath.

The following salts of sodium are used as purgatives: sodium phosphate and effervescing sodium phosphate, sodium sulphate, and effervescing sodium sulphate, the effervescing citro-tartrate of sodium, tartarated soda, or Rochelle salt, and the effervescing powder of tartarated soda, or Seidlitz powder.

Sodium citrate is a refrigerant. It is often used to prevent the formation of thick curds in the milk given to bottle-fed babies or invalids, one grain or more being added to each ounce of milk. Sodium sulphite, dose 5 to 20 grains, is sometimes taken to relieve fermentation in the stomach, and for this purpose the solution of chlorinated soda, dose 10 to 20 minims, may also be taken diluted with water. Half a drachm of this solution in an ounce of water makes an excellent antiseptic gargle or mouth wash, or a lotion for bathing wounds or sores. Sodium hypophosphite, dose 3 to 10 grains, acts as a tonic. Sodium bromide, sodium iodide, sodium arsenate, sodium benzoate and other salts owe their usefulness to the acid which they contain. *See* Bromide ; Hypophosphite ; Potassium.

SOFTENING OF THE BRAIN. *See* Dementia ; Embolism.

SOLAR PLEXUS. Situated behind the stomach, but in front of the abdominal aorta, the solar plexus consists of a matted network of nerve fibres connected with a mass of nerve tissue on either side, which, from the shape, is called the semilunar ganglion. In connexion with this plexus are subsidiary plexuses supplying the stomach, bowel, liver and other abdominal viscera. The plexus forms part of the sympathetic nervous system (q.v.).

SOMNAMBULISM. Sleep-walking, or somnambulism, occurs most frequently in children. Although the senses may be acute and complicated movements be performed, nothing that happens during somnambulism can be remembered. Although there is usually sufficient awareness during sleep-walking to prevent the person from injuring himself, there is a risk of his doing so if suddenly awakened. A person who is subject to sleep-walking should have someone sleeping in the same room ; if this cannot be done the door should be locked or fastened with a chain and the window should be protected. To remove the cause of the habit some kind of psycho-therapy would be required.

SOOTHING SYRUP. Preparations are sold as soothing syrups to be given to fretful infants or children. The indiscriminate use of nostrums of this kind is highly blameworthy, as the proper course is to discover the cause of the fretfulness and treat that. It may be teething, indigestion, constipation or some other minor disorder, but, on the other hand, it may be some serious disorder, requiring active treatment, and valuable time is lost by giving soothing syrups.

SORE THROAT. *See* Clergyman's Throat ; Diphtheria ; Larynx ; Pharynx ; Tonsil.

SPASM. An involuntary or undue contraction of a muscle is described as a spasm. The usual cause is irritation of the nerve cells or nerves supplying the muscle. When spasm is more or less general over the body the occurrence is called a convulsion or a fit. A localised spasm when painful, is called a cramp. The stiff or sticky gait, observed in paraplegia is described as a spastic gait and is due to chronic excess of tone in the paralysed muscles. *See* Antispasmodic ; Cramp ; Nervous System ; Tic ; Tetany.

SPEECH. The definition of speech as the communication of ideas by articulate sounds sets out three propositions regarding it. The first is that speech is primarily a mental process. It implies the storage in the mind of a stock of names for things, qualities and actions, and an intelligent method of stringing words together. All this is accomplished in the brain, especially in certain centres in its cortex. An injury or disease that interferes with the cells in such centres, or with the fibres that link them together, interferes with the thought processes of speech. A speech-defect of this type is called aphasia (q.v.). In the second place, speech implies the production of sound. This is effected by vibrations of the vocal cords, and these in turn by the rush of air through the larynx in consequence of breathing movements. When there is partial paresis of the vocal cords, as in laryngitis, no sound may be produced and the voice sinks to a whisper. When the voice is lost suddenly and there is no obvious abnormality to be seen in the cords, the cause is hysteria. Loss of voice is called aphonia.

Thirdly, the sound produced in the larynx is modified by alterations in the shape of the mouth and pharynx and by certain movements of the lips, teeth, tongue and palate. This action is described as articulation, and the nerve centres controlling it are situated in the bulb, or medulla of the brain and are connected with the speech centres in the brain. Lesions affecting these centres, the nerves proceeding from them or the muscles supplied by such nerves, may cause dysarthria, that is, difficulty in articulating.

Stammering, or stuttering, is not due to actual defect in the speech mechanism but to inability to control it on account of emotional disturbance. It is an expression of anxiety-hysteria, and an attempt should be made to cure it by finding out the emotional disturbance that underlies the hysteria. Voice exercises, as in declaiming, and breathing exercises may be beneficial by giving the patient confidence.

SPERMATIC CORD. *See* Genital System.

SPERMATORRHOEA. The involuntary discharge of semen is called spermatorrhoea. It commonly takes the form of nocturnal emissions, but may occur after micturition or when the bowels move. Much harm comes from reading quack literature on this subject instead of consulting a doctor.

SPERMATOZOON. The human male germ cell, or spermatozoon, consists of a head, a neck, a middle piece, and a long, slender tail. The total length is $\frac{1}{400}$ in. The spermatozoon progresses by an undulatory movement of the tail.

SPINAL CORD. The spinal cord occupies the canal formed by the arches of the superimposed vertebrae of the spine, as shown in the illustration in page 503. It is continuous above with the medulla, or bulb, the lowest part of the brain, and extends downwards as far as the lower border of the first lumbar vertebra Its average length in the male adult is about 18 in. and its thickness about that of the little finger. The membranes of the brain are prolonged through the foramen magnum, the large opening in the base of the skull, and the outermost, the dura mater, lines the spinal canal. Within this is the arachnoid, and, around the cord, the pia mater.

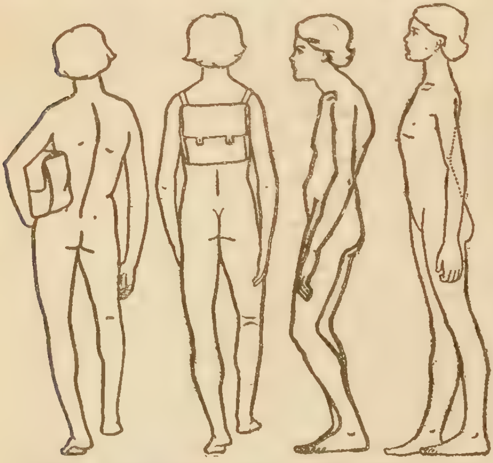
The cord is cylindrical in shape, but somewhat flattened in front and behind, and presents two enlargements, one in the cervical region, from which the nerves to the arms go out, and another in the lower dorsal region, from which are supplied the nerves to the legs. There are thirty-one pairs of spinal nerves, namely, eight cervical, twelve dorsal or thoracic, five lumbar, five sacral and one coccygeal. In a cross section of the cord the grey matter occupies the central part, and has a shape somewhat like the letter H. In the grey matter are numerous groups of nerve cells.

One important function of the cord is to serve as a conducting cable, as it were, between the brain and other parts of the body, the nerve fibres being grouped together in bundles, or tracts, according to their function and the parts they supply. The other function of the cord is to act as a reflex centre. The spinal nerves have a segmental distribution which is most clearly seen in the thoracic nerves, each of which passes round beneath a rib, thus supplying a ring of the body tissues.

Diseases of the Spinal Cord. A severe jarring of the body may cause concussion of the spinal cord, the result of which is paralysis of the parts supplied by the affected parts of the cord. This will probably clear up, however, with complete rest. The continuity of the cord may be interrupted more or less by myelitis (q.v.), caused by pressure from disease or dislocation of the spine, tumours or haemorrhage of the spinal canal or cord, etc. In the disease known as syringomyelia (q.v.), cavities form in the grey matter interrupting the fibres conducting impulses of temperature and pain. Inflammation in the grey matter is called poliomyelitis, and is discussed under the heading, Infantile Paralysis. Spinal meningitis may be caused by extension from the meninges of the brain, as in cerebro-spinal fever, or occur independently, when the cause may be a penetrating or other injury, or infection. *See* Ataxia ; Cerebro-spinal Fever ; Friedreich's Ataxia ; Myelitis ; Nervous System ; Progressive Muscular Atrophy.

SPINAL CURVATURE. The structure of the spine is described under the heading Backbone, where it is noted that the spine, though straight when viewed from the back, presents four curves when viewed from the side, namely, one in the neck and another in the lumbar region, with the convexity forwards, and one in the back, or dorsal region, and another in the sacrum with the convexity backwards. The deformity referred to as spinal curvature may be an exaggeration of one of those curves or it may be a new curve, that is to say, in a lateral direction and visible when the spine is looked at from behind. Exaggeration of the normal backward dorsal curve is called kyphosis, or, if there is a sharp projection, angular curvature ; exaggeration of the forward lumbar curve, lordosis ; and lateral curvature, scoliosis.

Kyphosis, commonly known as round shoulders, may be associated with a disappearance or even reversal of the lumbar curve, producing the so-called C type of deformity, the whole spine curving backwards. This sometimes happens in rickets from softness of the bones, and in old people from thinning of the intervertebral disks. It may be due to other disorders, involving the bones or joints of the spine, but the commonest cause is habitual stooping. This faulty posture is encouraged in school-children by short-sightedness and it is also incidental to cobbling and other trades. A factor in causing kyphosis, especially in children, is a loss of tone in the muscles of the back. Lordosis occurs in stout people, in cases of large abdominal tumours and during pregnancy, and in these instances, by shifting the centre of gravity further back, corrects a tendency to fall forwards. It occurs also in congenital dislocation of the hip and hip-joint disease in order to compensate for flexion at the joints.



SPINAL CURVATURE. This usually results from incorrect carriage. Correct postures are shown in the second and fourth diagrams

Scoliosis is occasionally present at birth and caused by imperfect development of one side of a vertebra. It may be caused by rickets, by shortness of one leg, or by hip-joint disease, but the usual cause is a loss of tone in the muscles of the back. This loss of tone may result from an acute fever, or another debilitating illness, but can sometimes be attributed to chronic constipation, infection in the tonsils or ears, adenoids, or to overwork and an insufficiency of open-air exercise. Angular curvature is oftenest due to tuberculous diseases of the spine or Pott's disease (q.v.).

The treatment of spinal curvature depends on the cause. In the postural type the first object is to restore muscular tone by cleaning up sources of toxaemia and by improving the general health by fresh air, good food and tonics, such as iron, arsenic and cod-liver oil. In addition to this the child should carry out prescribed exercises, under careful supervision. Children with short sight should be fitted with proper glasses. It is important that this treatment should begin as early as possible.

When the back is very weak it may be desirable for the child to wear a spinal support during some part of the day. In the other forms of curvature much may be done by correcting the cause, lengthening a leg by a high-heeled boot, for example, but in some cases little can be done. Pain can sometimes be relieved by exercises, but a spinal support will often be needed. *See* Backbone; Jacket; Pott's Disease; Rickets.

SPINE. *See* Backbone.

SPLEEN. The largest of the ductless glands, the spleen is situated in the upper left-hand corner of the abdomen, towards the back and just below the diaphragm. Its shape somewhat resembles that of a segment of an orange, and in an adult it weighs rather less than half a pound. It is dark red in colour. The blood vessels of the spleen are large. The capillaries into which the artery breaks up open into blood spaces from which other capillaries take their origin and conduct the blood of the splenic vein, which is a tributary of the portal vein. The spleen contributes new corpuscles, both white and red, to the blood, and in the spleen there is partial destruction of the effete red corpuscles.

The spleen may be ruptured by a crush or a blow, and more readily if it is enlarged, when, in fact, it may even rupture spontaneously. Enlargement of the spleen, or splenomegaly, may occur from a large number of causes. In the tropics an acute enlargement is most often due to malaria. Enteric fever, streptococcal septicaemia, pyaemia, anthrax and other infections which occur anywhere, are also causes of acute enlargement. Chronic enlargement may be due to malaria, leukaemia, splenic anaemia, pernicious anaemia, Hodgkin's disease, amyloid disease, hydatid disease, and other disorders, and in some of these the organ may fill the whole of the left side of the abdomen. Treatment depends on the cause.

SPLENIC ANAEMIA. A disease for which changes in the spleen appear to be primarily responsible is described as splenic anaemia. Males are frequently attacked, and usually at or before middle age. Commonly the first indication of the malady that is noticed is fullness and a sense of weight in the abdomen. The treatment at the beginning is usually that of anaemia (q.v.) simply, but removal of the spleen is necessary to a radical cure.

SPLINT. Any rigid substance applied to a part of the body in order to prevent movement may be described as a splint. The substance may be wood, metal, leather, poroplastic, plaster of Paris or anything else that answers the purpose. In an emergency, walking-sticks, umbrellas, brooms, bundles of newspapers or of twigs, and many other things may be used to improvise a splint. The most familiar use of splints is in the treatment of fracture, but in certain diseased states splints are equally useful. To prevent movement in a part of a limb it is necessary to fix both the joint above it and the joint below Unless a splint is well padded it may cause serious damage by pressure, and particular care must be taken to pad over bony prominences like those at the ankle. While the bandages attaching the splints must be sufficiently tight to hold them securely, they should not be tight enough to interfere with the circulation in the limb.

Certain splints are specially named, mostly after the person who first introduced them. Perhaps the most useful of these is Thomas's splint. This is made of metal and consists of a padded ring to go round the hip or shoulder and limbs extending from the ring and united at their other ends (*see* Plate 52). A Thomas's splint allows of extension being applied to the bone or joint being treated. Liston's splint is a long splint, reaching from the armpit to below the sole of the foot, and with triangular notches cut in its lower end, thus forming a peg round which bandages can be drawn tightly. *See* Bandage ; Extension ; Fracture ; Ischaemia.

SPOTTED FEVER. *See* Cerebro-spinal Fever.

SPRAIN. A sudden overstretching of a muscle or of the ligaments of a joint is called a strain when it stops short of actually tearing the structure, but when there is tearing it constitutes a sprain. A strain is followed by little or no swelling of the part, but swelling follows a sprain. If it occurs immediately, it is due to the effusion of blood, if after the lapse of several hours, or a longer period, to inflammatory exudation. Even a strain, however, may cause very acute pain. When there is effusion of blood into the tissues, there is a red or livid discoloration of the skin, the colour changing to green and then yellow in the course of a few days. Inflammation in a joint may cause, in addition to local heat, pain and tenderness, a painful sense of pressure, or tension in the joint. An X-ray examination is desirable when there can be any possible doubt as to the extent of the injury.

The first-aid treatment of a strain or sprain of a joint consists of rest and cold applications. If the injury can be treated as soon as it occurs, however, a firm bandage should be applied evenly and smoothly over the joint in order to limit internal bleeding, or if the accident has occurred out of doors the boot should be left on, and a bandage applied over it and wetted. As it dries the bandage shrinks and increases the pressure. A strain of a joint is often treated by strapping with plaster, but skill is required to do this properly. Sprains may be treated by putting a layer of cotton-wool about one inch thick over the joint, and for an inch or two beyond it on either side, and bandaging as firmly as possible, without causing discomfort, with a flannel bandage. The bandage is taken off once or twice a day. Heat may be applied to relieve pain. The patient should be encouraged to move the joint gently from the outset, to prevent adhesions.

Strains or sprains of muscles are treated by rest and cold or hot applications. Movements that cause dragging on the injured muscle should be avoided, and by a skilful application of plaster this may be accomplished, although other movements of the limb can be carried out. *See* Joint; Muscle; Tendon.

SPRAY. A liquid drug or a solution of a drug may be applied to some surface of the body in the form of a spray. Here the liquid is in a state of fine subdivision. An apparatus producing a fine cloud-like spray is called a nebuliser, vaporiser or atomiser (q.v.). In this the liquid is oily, and this type of spray is the better for applying remedies to a surface. A coarse spray is usually a watery spray, and is the best type for cleansing a surface.

A cleansing spray might consist of 5 grains each of sodium bicarbonate and common salt, half a drachm of glycerin and water to one ounce; or of 2 grains of permanganate of potassium dissolved in an ounce of water. The latter is also antiseptic and deodorant, and is useful as a prophylactic against a common cold or influenza. *See* Atomiser; Gargle; Inhalation.

SPRUE. People living in the tropics, especially Europeans, may suffer from sprue, a disease also known as Indian hill diarrhoea. There is indigestion and diarrhoea. Then superficial ulcers form in the mouth, and chewing becomes very painful. Diarrhoea occurs in the mornings, copious pale, frothy motions being passed. This may go on for months, and the patient becomes thin and anaemic. The treatment is to take calcium lactate, 10 to 15 grains, in a cachet, or, failing this, calcium chloride or lime-water, three times a day, and $\frac{1}{10}$ grain of parathyroid extract twice a day. This treatment is kept up for several months after the disease is apparently cured.

SPUTUM. Substances that are coughed up are referred to as sputum, or expectoration, and usually come from the air tubes or lungs, but sometimes from the throat. The characters of the sputum may give useful indications of the nature of a pulmonary affection, and of the stage that it has reached. In acute bronchitis the sputum is at first scanty and clear, and, if vomiting is violent, may be streaked with blood. As the disease progresses the sputum becomes more abundant and mixed with pus. A very profuse watery and frothy sputum suggests oedema of the lungs. In bronchiectasis, consumption and even in later stages of bronchitis the sputum may contain a very large amount of pus.

When the sputum contains a certain amount of pure or almost pure blood, the occurrence is described as haemoptysis. The first possibility to be considered in this event is consumption. An offensive, foul-smelling sputum occurs in foetid bronchitis, bronchiectasis, gangrene of the lung, and sometimes in consumption. In bronchiectasis large quantities of sputum may be coughed up at one time, and also when there are diseased cavities in the lung, as in consumption. *See* Cough.

SQUILL. The squill bulb contains a bitter active principle, scillitoxin, which stimulates the lining of the air-tubes and also the kidneys, so that the drug is given as an expectorant and diuretic. Its use as an expectorant should be limited to chronic bronchitis, as it is likely to aggravate acute conditions. Similarly it should not be given when there is Bright's disease, its chief use as a diuretic being in cardiac dropsy.

SQUINT. Failure to focus the vision of both eyes on the same point constitutes a squint, or strabismus. One eye is fixed on the object looked at, but the other is turned from it. The commoner type of this disorder, concomitant squint, occurs in children. It is due to some defect in the eye, usually an error of refraction which may not induce a squint until the general health is impaired, and it is not uncommon for a squint to appear after an illness. The child learns to ignore the image on the retina of the squinting eye, and thus avoids double vision, which is a prominent symptom in the other type, paralytic strabismus.

A child should be taken to a doctor as soon as any tendency to squint is observed. Possibly the squint may be cured by wearing suitable glasses, though sometimes the squinting eye must be trained to its work by preventing vision with the other for a time, or exercises with a stereoscope, or some other instrument, may be prescribed. Paralytic squint is due to interference with the 3rd, 4th, or 6th cranial nerves, which may occur in diphtheria, syphilis and other disorders. Double vision is the chief symptom, though sometimes there is considerable giddiness. *See* Eye; Vision.

STAMMER. *See* Speech.

STARCH. The group of natural carbohydrates called the polysaccharides or polysaccharoses includes starch, cellulose, dextrin, glycogen and some others. Starch is widely distributed in the vegetable kingdom, especially in seeds and tubers. Wheat and other cereals contain about 60 to 70 per cent; rice, 75 to 80 per cent; tapioca, 87.5 per cent; and potatoes, 15 to 20 per cent. Starch occurs as granules, variously shaped according to its source, but always constructed of alternate layers of starch and cellulose around a central nucleus.

Starch is insoluble in cold water but forms an opalescent solution with boiling water, which when it cools hardens into a jelly. Boiling splits the cellulose envelopes and exposes the starch, and for this reason starchy foods require cooking. In digestion starch is first converted into dextrin, and then by further stages is converted into grape sugar. Starch must be converted into sugar before it can be absorbed, but is not stored in the body as sugar, but as glycogen.

Starch is included in the pharmacopoeias under its Latin name, amylum. Starch powder is used to soothe inflamed conditions of the skin, generally in combination with zinc oxide powder. Mucilage of starch is used as an enema to relieve irritation and check diarrhoea. A solution of starch is an antidote for iodine poisoning. *See* Carbohydrate; Digestion; Food; Sugar.

STARVATION. When the body is deprived of food it is thrown upon its reserves of fat and the glycogen stored in the liver and muscles. There comes a time, however, when it even draws on the protein in the muscles. The most vital organs, the heart and brain, suffer last and least. Rest and warmth mitigate to some extent the effects of starvation. Care must be exercised in feeding a person who has been starved; the diet ordinarily prescribed for fever (q.v.) is suitable. *See* Emaciation; Fasting.

STATUS LYMPHATICUS. Infants and even older children may have an undue development of the thymus gland (q.v.) and probably with this enlargement of other collections of lymphatic tissue throughout the body. This condition is called the status lymphaticus or lymphatism. The children are usually plump but flabby and may be anaemic, though often the general health appears to be quite satisfactory. There is a tendency to sudden death from slight shocks.

STERILISATION. *See* Antiseptic; Disinfection.

STERILITY. Barrenness, or sterility, most commonly results from some defect in the female. It may be due to some congenital malformation of the generative organs, a lack of activity in the ovaries, which may also be shown by obesity, or the cause may be some such disorder as displacement of the womb, inflammatory changes in the genital organs or a tumour. Similarly, in the male there may be congenital defects, but the most common cause of inability to procreate, a different thing from sexual impotence, is some consequence of inflammation. The most common cause of inflammation of the genital organs, male or female, it may be added, is gonorrhoea. Sterility may occur, however, when there is no gross defect, either congenital or acquired. The use of contraceptive methods in the early years of married life and before conception has occurred may make the remaining years of the marriage sterile. *See* Genital System.

STIFF NECK. *See* Fibrositis; Wry Neck.

STILL BIRTH. A still birth must be notified to the Medical Officer of Health within 36 hours after birth. A still-born child is one with a total length of over thirteen inches, and which shows no sign of life whatever at birth. If the birth takes place after the 28th week of pregnancy it must also be registered.

STIMULANT. The action of a stimulant may be more or less general in its scope, or be confined to some particular organ. A general stimulant increases the sense of well-being, removing fatigue, quickening and cheering the mind and making bodily exertion easier. Such effects are commonly ascribed to alcohol, but although alcohol in small doses stimulates digestion and, for a short time, the heart, its main action is that of a narcotic. Tea, coffee and other beverages containing caffeine act as true general stimulants, but other things than drugs may do so, such as sunshine, a sea breeze or good news.

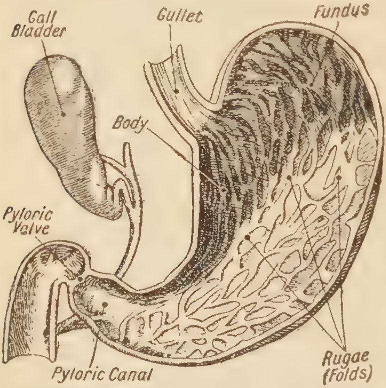
Local stimulants are classified according to the particular organ that they affect. Thus, there are cardiac stimulants, such as ammonia, camphor or even hot water; digestive stimulants, such as condiments and bitters, and so on. *See* Tonic.

STING. *See* Bee Sting.

STOMACH. The portion of the alimentary tract from the lower end of the gullet to the beginning of the duodenum, or first part of the small intestine, is called the stomach. Its shape differs according as it is full or empty. When full, it is somewhat pear-shaped, but the narrow, or pyloric, part is placed horizontally, running to the right, while the rest, the cardiac part, is more vertical. The uppermost part rises above and to the left of the opening of the gullet into the stomach and is known as the fundus of the stomach. It is usually filled with air. The part of the stomach between the fundus and the pyloric portion is usually called the body. The opening from the gullet into the stomach is called the cardiac opening, and from the stomach into the duodenum the pyloric opening.

The stomach is covered with peritoneum, and from the greater curvature of the organ the layers of this membrane are prolonged downwards to form the apron-like structure known as the great omentum. Other folds connect the stomach with the spleen and with the diaphragm. Below, the stomach is in close relation to the pancreas. There are three muscular coats in the stomach, an outer or longitudinal, a middle or circular, and an inner or oblique. At the pyloric opening the circular coat is greatly thickened to form what is called the pyloric sphincter, which, by contracting, is able to shut off the stomach from the bowel. The stomach is lined by a mucous coat, between which and the muscle coats there is a layer of loose, fibrous tissue called the submucous coat. In this run blood vessels, lymphatics and nerves, branches of the right and left vagus, and fibres from the sympathetic system.

The internal surface of the stomach displays an immense number of small openings which represent the ducts by which the gastric glands pour their secretion into the stomach. These glands are tiny tubular structures in the mucous coat, lined with cells, which secrete the digestive ferment pepsin and the milk-curdling ferment rennin. Other glands secrete the hydrochloric acid of the gastric juice. In addition to these substances and water, of which it contains a very large amount, gastric juice contains some mucus and a fat-splitting ferment or lipase. Its actions are discussed under the heading Digestion.



STOMACH. The lining is of mucous membrane which forms folds when the organ is empty but smooths out when it fills

DISEASES OF THE STOMACH. Indigestion, inflammation of the stomach lining or gastritis, and gastric ulcer are discussed under those headings. An increase in the amount of gastric juice causes acidity, or hyperchlorhydria. If the juice contains too little hydrochloric acid the condition is called hypochlorhydria. This may occur in gastritis and certain nerve disorders. Dilation of the stomach is caused by narrowing, or stenosis, of the pyloric opening, or by atony or weakness of the muscle wall, induced by constant overfilling of the organ, or otherwise. Pyloric stenosis may be due to the contraction of scars of ulceration, to cancer, or to hypertrophy of the pyloric sphincter. When the stomach is dilated it may contain large quantities of fluid in which fermentation occurs, and which is vomited from time to time, the vomited matter usually being greyish in colour, with a sour smell, and showing a frothy scum on the surface when it is allowed to stand. When the fact of dilatation is established, the next step will be to determine whether there is obstruction and its cause. Treatment consists in daily lavage of the stomach, though it will be necessary to consider the question of an operation to relieve obstruction when this exists. A condition which may be confused with dilation is that of dropped stomach, or gastroptosis. This usually occurs in association with visceroptosis (q.v.).

Cancer of the stomach usually occurs in late middle life, and more frequently in men than in women. There is sometimes a history of a gastric ulcer, or of bouts of indigestion, but often there is nothing of the kind. It should be considered a suspicious circumstance when dyspepsia occurs in a middle-aged man, previously free from anything of the kind, particularly when the symptoms are not entirely removed by ordinary simple treatment. It is important that the disease should be diagnosed at the earliest possible opportunity, as an operation then may cure it.

Rupture of the stomach may be caused by perforation of a simple or a malignant ulcer. Rupture usually gives rise to considerable shock, but this may be recovered from in an hour or two, and the patient may complain of little more than thirst. Liquids should be withheld, however, and the patient should attempt to relieve his thirst by sucking a pebble. Immediate surgical treatment is urgently necessary.

STOMACHIC. *See* Appetite; Bitters; Indigestion.

STOMACH PUMP. A pump with a long rubber tube attached is sometimes used to draw off the contents of the stomach, but the usual instrument for this purpose is the stomach tube, which is used as a siphon. The tube is about 39 in. long and may have a funnel-shaped expansion at its upper end.

STOMATITIS. Term for inflammation of the mouth (q.v.)

STONE. *See* Calculus.

STRABISMUS. *See* Squint.

STRAIN. *See* Sprain.

STRANGURY. An urgent desire to pass urine, accompanied by severe pain, and the passage of a few drops only or none at all, is described as strangury, or vesical tenesmus. The passage of urine does not relieve the pain nor the feeling of an urgent necessity to pass more. Something of this kind may happen from the presence of gravel, but in an aggravated form is more likely to be due to stone, inflammation of the bladder or prostate, or of the urethra, as in gonorrhoea. In women it may be caused by prolapse of the womb, or some other disorder of the womb or ovaries. Hot hip baths and fomentations are helpful, and the patient should drink large quantities of bland liquids.

STRIDOR. A harsh, creaking or whistling sound produced in the act of breathing is called stridor. Stridulous breathing is due to obstruction in the larynx, and this may be caused by diphtheritic membrane, oedema, paralysis or spasm of the vocal cords, etc. *See* Croup; Diphtheria; Larynx; Rickets.

STROKE. *See* Apoplexy.

STRYCHNINE. *See* Nux Vomica.

STYE. A hordeolum, or stye, is a little abscess at the root of one of the eyelashes, caused by infection of the sebaceous glands in the margin of the lid. There is first a little red and very painful swelling at the root of the lash, which in the course of a few days becomes yellowish on the top and bursts, the discharge of matter relieving all the symptoms. Treatment consists in pulling out the affected lash and applying hot fomentations. Frequently the general health is unsatisfactory and tonics may be required. When styes tend to recur in one who appears to enjoy good health otherwise, the eyesight should be tested.

STYPTIC. A substance that arrests bleeding is called a haemostatic or styptic. Cold water or ice is often valuable and sometimes, as in bleeding from the womb, very hot water. Chemical styptics include vinegar, oil of turpentine, the tincture, or preferably the strong solution, of perchloride of iron, alum, copper, zinc or lead salts, tannic acid and substances containing this, such as witch-hazel, kino, krameria and red gum. One of the most powerful styptics is adrenalin. *See* Bleeding; Ligature; Tourniquet.

SUDAMINA. *See* Miliaria.

SUDORIFIC. *See* Diaphoretic; Sweat.

SUFFOCATION. *See* Asphyxia.

SUGAR. The sweet class of carbohydrates comprises the sugars. There are different kinds of sugar, but it will suffice to mention two groups, which are of importance to health. The first is that of the hexoses, a sub-group of the monosaccharides or monosaccharoses. This includes dextrose, also called glucose and grape sugar; laevulose, also called fruit sugar and fructose; invert sugar, which is a mixture of dextrose and laevulose; and galactose. Dextrose exists in all fruits, and is prepared commercially by boiling starch with acids. Starch is converted into glucose during digestion, and sugar can only be absorbed as glucose or laevulose. Laevulose is present in many fruits. Invert sugar exists naturally as honey, but can be prepared by boiling cane sugar or by the action of dilute acids or of ferments on cane sugar. Thus it is formed in the stomach by the action of hydrochloric acid and in the bowel by a ferment. Galactose is formed by the digestion of lactose, or milk sugar.

The second group of sugars is that of the disaccharides or disaccharoses. To this group belongs cane sugar, sucrose or saccharose. This is obtained from the sugar cane but also from other sources, such as the beet and the maple. In this group are also maltose, which is formed by the action of ferments on starch either in germinating grain or malt, or in the digestive tract, and lactose, or milk sugar.

Sugar is a very valuable food, being a source of energy. There is a tendency, however, to take too much sugar, and the excess is responsible for indigestion and for obese flabbiness in some children. *See* Carbohydrate; Digestion; Saccharin.

SULPHUR. Brimstone, or sulphur, is a yellow, non-metallic element, and is used in medicine in the form of sublimed sulphur, or flowers of sulphur, a gritty greenish-yellow powder, or of precipitated sulphur, or milk of sulphur, a greyish-yellow powder, which is free from grittiness. The dose of each of these is 10 to 60 grains. A pleasant way of taking it is as the confection of sulphur which contains cream of tartar also. With the exception that the sulphur is in the precipitated form, the lozenges of sulphur may have the same composition as the confection. Sulphur is the principal ingredient of the compound liquorice powder. Sulphur is used internally as a laxative, in certain skin diseases, in chronic rheumatism, etc. Applied externally, sulphur is a parasiticide, and is the best remedy for scabies. It is generally used as sulphur ointment, but sometimes as Vleminckx's solution. Another method is to use a sulphur bath, made by mixing 5 ounces of sulphurated potassium in a large warm bath. Sulphur is used externally for other skin diseases such as dandruff, seborrhoea or acne. For dandruff, the ointment may be used, but for other complaints about 5 grains of sulphur is incorporated with an ounce of Lassar's paste. The drug is irritating to the skin, and care must be exercised in its use. A sulphur candle affords an excellent method of disinfecting by fumigation. *See* Disinfection.

SULPHURIC ACID. A heavy, colourless, oily liquid, sulphuric acid, or oil of vitriol, is a powerful caustic. Dilute sulphuric acid and aromatic sulphuric acid are sometimes given to arrest bleeding from the stomach or upper reaches of the bowel. The dose of each is 5 to 20 minims. The dilute acid is also used in the prevention and cure of lead poisoning. *See* Caustic.

SUNBURN. The tanning of the skin which follows exposure to sunlight is preceded by more or less redness, or erythema, and sometimes by swelling and blistering. Should inflammation be pronounced calamine lotion or zinc ointment may be applied. To remove the tanning, cucumber juice and almond emulsion is used. *See* Dermatitis; Freckles; Light.

SUNLIGHT. *See* Light.

SUNSTROKE. *See* Heat Stroke.

SUPPOSITORY. Drugs may be introduced into the rectum in a suppository. This is a cylindrical object, sharpened at one or both ends and consisting of a basis, usually of cacao butter or oil of theobroma, but sometimes of gelatin and glycerin, in which the desired drug is incorporated. There are seven official suppositories, those of carbolic acid, tannic acid, belladonna, glycerin, iodoform, and morphine, and the compound suppository of lead. A suppository for the vagina is larger than the rectal type and generally is egg-shaped. It is usually called a pessary.

SUPRA-RENAL GLAND. The structure and functions of the supra-renal glands are described under the heading Adrenal.

SWALLOWING. In the first of three stages of swallowing, or deglutition, the tongue passes the substance to be swallowed backwards while at the same time the soft palate is drawn upwards, shutting off the nasopharynx, and the opening of the larynx is drawn up beneath the base of the tongue, thus shutting of the lower air-passages. Then the muscles around the pharynx contract, pressing anything that is being swallowed into the opening of the gullet, down which tube it is carried by a peristaltic movement. Difficulty in swallowing, or dysphagia, may be due to some disorder of the gullet, but sometimes the fault is in the mouth, the pharynx or the larynx, and reference should be made to each of these headings for a full account of the causes and treatment of dysphagia. *See* Gullet.

SWEAT. Perspiration or sweat is secreted by special glands which are situated in the deepest part of the true skin or in the subcutaneous tissue all over the body. The duct of the gland passes up through the skin and opens on the top of one of the superficial ridges (*see* illustration page 574). The glands are most numerous in the palm and sole, are large in the armpit and groin. Sweat is a very watery fluid, containing small amounts of salts and urea. It is acid in reaction, but usually becomes alkaline if sweating is profuse. It is being continuously discharged from the skin, but may evaporate at once. Such is described as insensible perspiration, as contrasted with the sensible perspiration that occurs when one is warm or takes exercise. The total amount of sweat excreted in 24 hours is about 1½ pints.

The evaporation of sweat cools the surface of the skin and is a factor in lowering body temperature. Poisonous substances may also be excreted in the sweat so that in Bright's disease and in uraemia part of the treatment consists in inducing free sweating. Dryness of the skin and inability to sweat increases the risk of heat stroke when circumstances favour its occurrence. It is desirable to keep the skin active in fevers, in order to promote coolness. Drugs that do this are called diaphoretics (q.v.).

Hyperidrosis is the name given to excessive sweating. It occurs in certain diseases such as consumption, malaria, and pyaemia. In rickets there is commonly free sweating about the head. An agent that reduces sweating is called an anhidrotic, and in this class are included belladonna, quinine, zinc oxide, etc. For local sweating, in the armpits or feet, the best thing to do is to wash the parts frequently, bathe with weak solutions of permanganate of potassium or formaldehyde and dust over with a powder containing zinc oxide and salicylic acid.

SWEETBREAD. Two glands, the thymus and the pancreas, are sold by butchers as sweetbread. Both are mainly cellular in structure and both are very digestible and nutritious, and consequently very suitable for invalids. They should not be given to gouty subjects, however, as they are rich in purin bodies. *See* Invalid Cookery.

SWEET SPIRIT OF NITRE. *See* Ether.

SYCOSIS. The most important disease of the beard area is technically known as sycosis. It is an inflammation due to microbic invasion of the hair follicles and sebaceous glands. It may be acquired from an infected shaving-brush, but when it begins on the upper lip is generally due to an infective discharge from the nose. It most frequently occurs on the chin and the upper lip, and consists of a number of spots, hard and shotty, which tend to run together and to form matter.

It is imperative that the disease be taken seriously, and that the patient should recognize that he is suffering from an infection that may be communicated to other people. A further reason for paying serious attention to the trouble is that its natural course tends towards complete destruction of the roots of the hair.

The treatment of sycosis can be successfully undertaken by the use of X-rays. Otherwise, the older means of treatment are as follows : The hair must be cut short—shaving is impossible—and a lotion consisting of 1 in 1,000 or 2,000 solution of corrosive sublimate used several times daily. This contains mercury, and the same drug must also be used as an ointment, such as what is called white precipitate ointment. The fact that corrosive sublimate is a deadly poison must be kept in mind. The ointment must be rubbed in most thoroughly, and the vigour of application must not be relaxed when some improvement has been gained. *See* Barber's Itch ; Ringworm.

SYMPATHETIC NERVOUS SYSTEM. On either side of the spinal column in the neck, thoracic and lumbar regions, there is a chain of nerve ganglia, or nodules containing nerve cells. These belong to the sympathetic nervous system. They are connected by fibres with the spinal cord, and with other ganglia which lie further out, some of them actually in the walls of the intestine. There are similar ganglia at various points in the head and in front of the sacrum, but these constitute another part of the nervous system, namely, the parasympathetic. The ganglia in the head receive fibres from the brain through certain of the cranial nerves. The sympathetic and parasympathetic together form the autonomic nervous system.

The sympathetic system supplies branches to the internal organs of the chest, abdomen and pelvis, to blood vessels, to the sweat glands, to the tiny muscles that raise the hairs and to other parts. Impulses through sympathetic nerve fibres cause dilatation of the pupil, sweating, quickening and augmentation of the heart beats, stoppage of the flow of gastric juice, contraction of arteries and many other phenomena. The action of the parasympathetic system is more or less antagonistic to that of the sympathetic. Thus, it slows the heart and it stimulates the flow of gastric juice. *See* Nervous System.

SYNCOPE. *See* Collapse ; Fainting ; Heart.

SYNOVITIS. Inflammation of the synovial membrane of a joint (q.v.) is called synovitis, and of that lining a tendon sheath, teno-synovitis.

SYPHILIS. A highly contagious disease, syphilis is caused by the spirochaeta pallida or treponema pallidum, a germ resembling a tiny thread twisted like a cork-screw This is communicated by contact with an infected surface, which is generally brought about by sexual connexion, but may occur in kissing, suckling or touching syphilitic sores. Sometimes the contact is indirect, as in drinking from a glass that has been used by an infected person and not washed. After an incubation period, lasting on the average about four weeks, though it may be as many as six, what is called the primary sore appears on the site of infection. When developed it takes the form of a round, flattened elevation. The surface is slightly ulcerated, and exudes a slight watery discharge which may dry into crusts or scales. This sore is described as the hard, or Hunterian chancre. With the development of the sore the neighbouring glands become enlarged.

About six weeks after the appearance of the primary sore, the symptoms of the secondary stage make their appearance. There may be fever. There is a general enlargement of lymphatic glands all over the body, the superficial glands feeling like hard, shotty nodules. A rash also appears, usually having a resemblance to that of measles. The throat feels sore, the tonsils are enlarged and show superficial ulceration, and there will probably be white spots on the tongue and the inside of the lips and cheeks. The hair falls out. Within six months of the beginning of the disease there may be iritis, inflammation of the coloured curtain of the eye. In the secondary stage there is more or less copious infection of the blood with the parasites, but these gradually disappear, and this stage merges into the third, or tertiary, stage, in which, although the blood is free, parasites lurk in different parts of the body. From time to time, but perhaps as late as twenty or thirty or more years after infection, parasites in some such haunt may give rise to a swelling described as a gumma, which is liable to break down and ulcerate. The persistence of infection can be determined by applying the Wassermann test to the patient's blood and perhaps to the cerebro-spinal fluid. Another common tertiary lesion is degeneration of arteries. There is a still further stage of syphilis, the parasyphilitic, in which the mischief affects the nervous system and may be represented by locomotor ataxy or general paralysis of the insane.

Parents who are syphilitic may transmit the disease to their offspring. If the disease is active in the parents, the mother is likely to abort, or, at any rate, the child will probably be born dead, but as time goes on and the virulence of parental infection lessens, live children may be got, sometimes with the marks of the disease on them, but often apparently healthy. In these the disease may manifest itself after a week or two, but possibly only years after. In course of time children free from any taint of the disease may be born. Congenital syphilis may show itself a few weeks after birth by the development of nasal catarrh, described in this connexion as snuffles. The inflammation within the nose may progress and cause destruction of tissue, so that the bridge of the nose becomes flattened out. The skin generally may become shrivelled, and there may be great depression of the health. When the permanent teeth make their appearance, the upper central incisors may be peg-shaped, and have a notch cut out of the centre of the cutting edge. About this time also deafness may begin. At puberty inflammation of the cornea of the eye may occur, and may cause blindness. The nervous diseases described as parasyphilitic phenomena may occur in childhood in the subjects of congenital syphilis.

In its primary stage syphilis can be eradicated by treatment with organic arsenical compounds of the salvarsan class combined with mercury or bismuth, and very probably in the secondary stage also, although the treatment must be more thorough and more prolonged. Treatment in any case should last for at least two years. In addition to the drugs above mentioned, iodide of potassium is generally given, and this drug has a marked effect in curing the gummata of the third stage. The adequacy of treatment is tested by examinations by the Wassermann method at intervals, and a patient should not neglect treatment until assured by his doctor that it is safe to do so, nor should he marry for two years after the termination of treatment, and only then if periodical tests have been negative. *See* Chancre ; General Paralysis of the Insane ; Locomotor Ataxia ; Salvarsan.

SYRINGE. Various kinds of syringe are used in the treatment of different disorders. A very useful form is known as Higginson's syringe (Plate 44). This consists of a rubber tube, expanded in the middle into a ball, and with a bone or glass nozzle at one end and a metal valve at the other. Syringes with sharp needles are used for giving hypodermic and other injections through the skin, and also for withdrawing fluids for diagnostic purposes.

SYRINGOMYELIA. A nervous disease in which there is new growth in the grey matter of the spinal cord and the formation of cavities by degeneration of the growth, syringomyelia usually occurs before the age of thirty, and is more common in males. The sense of touch is preserved, but those of pain and temperature are lost, so the patient may burn himself seriously without feeling it. There is wasting and weakness of muscles, generally those of the upper limbs, and there may be trophic changes also in skin, bones and joints. Painless whitlows, or Morvan's disease are caused by syringomyelia. There is no satisfactory treatment. *See* Spinal Cord.

SYSTOLE. Term given to the contraction of the heart (q.v.)

TABES. *See* Locomotor Ataxia.

TALC. Talcum powder, or talc, consists chiefly of magnesium silicate. It is soft and unctuous and absorbs perspiration. It is therefore used extensively as a dusting powder.

TALIPES. *See* Club Foot.

TANNIC ACID. The tannin, or tannic acid, of the British Pharmacopoeia is obtained from oak-galls. There are three official preparations, namely, glycerin of tannic acid, suppository of tannic acid and the tannic acid lozenge. The drug is an astringent and styptic, and acts also as an antidote in poisoning by alkaloids. The glycerin is used for local applications. Tannic acid is used in inflammation of the mouth and throat, in nasal catarrh, in diarrhoea and as an injection or local application in "whites." Tannin is also contained in catechu, kino and other drugs, and in coffee and tea. A strong infusion or decoction of tea affords a ready means of giving tannin in cases of poisoning.

TAPEWORM. *See* Worm.

TAPPING. *See* Aspiration.

TAR. Coal tar is a by-product in the manufacture of coal gas. From it are obtained, directly or indirectly, carbolic acid and cresol, picric acid, aniline and aniline dyes, phenacetin, and similar drugs, and many other substances. Prepared coal tar is used in medicine in the form of liquor picis carbonis and liquor carbonis detergens. By the destructive distillation of the wood of pinus sylvestris and other pines is obtained Stockholm tar, which is known in pharmacy as pix liquida. From this is prepared tar ointment, tar water and syrup of tar. Tar has a stimulating action on the skin and also relieves itching. It is used extensively in treating psoriasis and chronic eczema.

TARTAR. *See* Teeth.

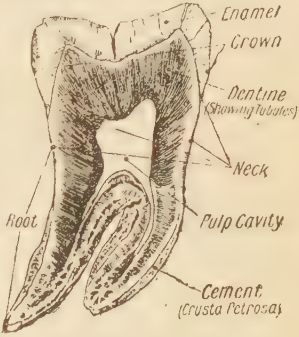
TARTAR EMETIC. *See* Antimony.

TASTE. The sense of taste depends on stimulation of organs known as taste buds, which are mostly situated in the tongue, though a few are found in the soft palate. To cause this stimulation, a substance must be in solution and the sensation it gives rise to is either sweet, sour, salt or bitter, or a combination of these. Sweetness is best appreciated at the tip of the tongue, sourness at the sides, and bitterness at the back. The nerves connected with the taste buds carry impulses to a centre in the medulla, and thence to the taste centres of the brain which lie in close relation to those concerned with the sense of smell.

The loss of taste may occur when the tongue is too dry or its surface disordered by the presence of a copious furring or otherwise. Loss of taste may also be due to disorder of the taste-nerves, or of their nervous connexions up to and including its centres on the brain. Loss of taste may occur in hysteria, and in this disorder there may also be hallucinations of taste, though such may also occur in insanity and when there is a tumour near the taste centres in the brain. *See* Sensation ; Smell ; Tongue.

TEA. The chief constituents of tea are caffeine or theine, to which the stimulating properties are due, tannic acid and a volatile oil. An excessive consumption of tea or over-infused tea may cause nervous irritability and sleeplessness, dyspepsia and constipation. Tea should be infused in water just brought to the boil and not for longer than five minutes. *See* Caffeine.

TEETH. A tooth exhibits a crown, a neck and one or more roots or fangs. The roots are composed of dentine, or ivory, and this exists also beneath the crown, surrounding a hollow in the centre of the tooth, described as the pulp cavity, which is continued down into the roots. In this cavity is the pulp, consisting of blood vessels, nerves and loose connective tissue. The crown is formed of an intensely hard substance known as enamel ; it forms a cap for the tooth and may have two or more eminences, or cusps, on its biting surface. The part of the jaw that carries the teeth is called the alveolus and along this are arranged the tooth-sockets. The dense soft tissue, or gum, which covers the alveolus, grips the neck of the tooth.



TEETH. Section of a tooth showing anatomical details

The process of cutting teeth is usually known as teething or dentition. There are two dentitions. In the first, the deciduous, temporary or milk teeth appear and consist of four incisors, two canines and four molars on each jaw. The incisors are the front cutting teeth, and the two in the middle are described as the central, and those on either side as the lateral, incisors. Outside the latter are the canines, which are sharp, pointed and adapted for tearing, and outside these again the molars or grinding teeth. The second dentition begins about the 6th year with the appearance of the first permanent molars and each year after this the other permanent teeth are cut. The third molar tooth may appear about the 17th year or not until the 25th, and is also called the wisdom tooth ; it may not erupt at all.

The first teething is sometimes a trying event for the infant and the gums may be swollen, hot and tender, and the child is feverish and restless. The digestion may be upset, and there may be constipation or diarrhoea. Sometimes there is earache, indicated by restless movements of the head and crying. Another possibility is that the child may have convulsions (q.v.). A child that is being suckled should not be taken off the breast while it is having difficulty in teething. Cool, boiled water may be given freely to cool the mouth and relieve thirst. If there is constipation fluid magnesia in the mornings is a useful remedy and the best remedy for diarrhoea is a teaspoonful of castor oil. Earache may be treated by applying cold cloths to the ear.

The use of a baby's comforter creates a danger of infection because the comforter may be dropped on the floor and be put back in the baby's mouth without being sufficiently cleansed, but there is this further count against it that it may cause malformation of the jaws. It is desirable that an infant should begin gnawing at crusts or rusks when it is about six months old as this practice helps to develop the jaws, and insufficient development may be due to the child not having been given firm food to gnaw When the teeth are overcrowded one or more of them should be extracted.

Unless teeth are efficiently cleansed there is a tendency to the deposition of tartar about the neck of the tooth, and this may separate the gum from the tooth, giving access to bacteria and possibly leading to pyorrhoea. Moreover, carbohydrate foods, such as sticky fragments of bread, may lodge in the crevices between the teeth, and ferment, giving rise to acid substances which attack and dissolve the tooth-substance. This is the beginning of caries, or decay, of a tooth. The natural method by which teeth are cleaned is by chewing crisp foods and such as require a good deal of mastication. The teeth should also be brushed, however, twice a day at least. The motion of the brush should be up and down and it is necessary to hold it vertically when brushing the backs of the teeth. A smooth dentifrice should always be selected.

As soon as decay begins the part should be cleaned out and stopped, and it is only prudent to have the teeth examined periodically by a dentist so that the first beginnings of caries may be discovered and dealt with. The importance of keeping the teeth sound cannot be over-estimated. Apart from the digestive troubles that proceed from deficient or defective teeth an enormous amount of illness is caused by the absorption of poisons from defective teeth.

Pain in a tooth, or toothache, may be due to mischief at the root or to exposure of the pulp by caries. If there is a cavity, a little pledget of cotton wool soaked in oil of cloves may be put into the cavity and warmth applied to the jaw. A dose of opening medicine may often be given with advantage. Sometimes pain caused by a diseased tooth is referred to a sound one, a fact to be borne in mind when there is a question of extraction.

Artificial teeth must be kept scrupulously clean. They should be taken out at night and brushed with tooth-powder, and then be left in water containing some antiseptic. A removable denture is much to be preferred to bridge-work as juices may lodge beneath the bridge and decompose. *See* Alveolus; Gum; Pyorrhoea.

TEMPERATURE. The normal temperature of the human body is 98.4° F. and climate makes no difference to this. There is a slight daily variation amounting possibly to 1° F., the higher temperature occurring in the evening. The temperature may also be raised slightly after a meal or after hard exercise, but it soon returns to normal. The heat of the body is produced by chemical action in the muscles and in the glands, especially the liver. Heat is lost in warming the air and watery vapour expired from the lungs, in the excretions of the bladder and bowels, but chiefly by conduction from the skin and sweating.

The fact that the body temperature keeps so constant means that a strict balance must be kept between heat production and heat loss. This is accomplished by centres in the base of the brain. Disease of one kind and another may upset the heat-regulating mechanism, and the temperature may go up or down. If, apart from the circumstances mentioned above, it goes up beyond 99° F. a state of fever (q.v.) exists. If the temperature falls below 98° F. it is subnormal, and below 96° it represents collapse. This is a dangerous state of affairs, and equally so is a temperature of 105.8° F. and over. The method of taking the temperature is described under the heading Thermometer.

TENDON. The white fibrous tissue by which so many muscles are attached to bone is known as tendon. Its fibres are strong and, unlike those of muscle, do not stretch. In the limbs many tendons are long and slender. Where it passes over a bone a tendon often runs in a fibrous sheath which is lined with synovial membrane. In some tendons little bones, known as sesamoid bones, develop. The knee-cap is the largest of these, but others exist in the tendons of the thumb and elsewhere.

A tendon may be snapped by a sudden strain, as, for example, the Achilles tendon in dancing; or a tendon may be cut across, an accident which is most common on the front of the wrist or of the fingers. The muscle usually contracts and pulls the severed ends apart. The ends may be brought and kept together sometimes by adjusting the position of the limb, but it is generally advisable to suture the ends together. *See* Muscle; Whitlow.

TENESMUS. A frequent, painful straining but ineffectual effort to empty the bowel is described as tenesmus. Little or no faeces is passed, but there may be a little blood and mucus. This occurs in acute dysentery and in other forms of acute diarrhoea. It may also occur in intussusception and in other disorders inside or outside the bowel. The treatment depends on the cause. Strangury (q.v.) is a similar condition in the bladder.

TEREBENE. A colourless liquid with a pleasant aromatic taste and smell, terebene is obtained by the action of sulphuric acid on turpentine. It is used as a stimulating expectorant and antiseptic in chronic bronchitis, pulmonary tuberculosis, and whooping-cough, and may be used as a spray or inhalation or, in doses of 5 to 15 mimims, may be given in an emulsion, in capsules or on sugar.

TESTICLE. The sexual gland in the male is called the testicle, or testis. There is a pair of these glands, a right and a left, and each occupies a separate compartment in the scrotum or bag in which it is suspended by the spermatic cord. The gland consists of two portions, the body or testis proper, and the epididymis. The shape of the body is somewhat like that of a kidney bean, the convex border being directed forwards. It has a tough, fibrous covering from the inner surface of which partitions project and divide the cavity into a number of spaces. In these spaces are contained the seminiferous tubules in which the spermatozoa are produced. The spermatozoa make their way along ducts into the upper part or epididymis, which consists of a long, convoluted tube, and are discharged into the main duct of the testis, the vas deferens. In addition to spermatozoa, the testicle produces a secretion which does not pass out through its duct but goes into the blood stream. This internal secretion is responsible for the existence of the sexual characteristics, both bodily and mental.

The testicles are developed within the abdominal cavity and do not pass out until just before birth. The testicle passes through the inguinal canal carrying with it a tube-like process of the peritoneal lining of the abdomen. The upper part of this tube becomes closed and obliterated very soon, but the lower part remains as a bag which covers in the testicle in front and at the sides. Sometimes fluid accumulates in the bag and forms a hydrocele. In some male children one of the testicles, or both, may not leave the abdomen, or may not get any farther than the inguinal canal. Frequently an undescended testicle is accompanied by a hernia, and an operation will probably be necessary.

Inflammation of the testis proper is called orchitis and of the epididymis, epididymitis. Acute orchitis is not uncommon in mumps and sometimes occurs in other infectious fevers. It may also occur by extension of gonorrhoeal infection from the epididymis. Chronic orchitis may follow acute attacks or be caused by syphilis or by extension of tuberculosis from the epididymis. The treatment of acute orchitis is to rest in bed and support the testicle by raising it on a pillow or by a suspensory bandage. Cold or hot applications are put on according to which gives more relief. It is advisable to take a sharp purge. The treatment of chronic orchitis is mainly that of the cause. *See* Genital System; Hydrocele; Varicocele.

TEST MEAL. Meals consisting of bread, milk, cornflour or mucilage mixed with bismuth carbonate or barium sulphate, are given before X-ray examinations of the digestive organs. Another form of test meal is given to determine digestive capacity.

TETANUS. *See* Lockjaw.

TETANY. A spasmodic nervous disorder, tetany may occur in either sex and at any age. In children it is associated with rickets and in adults with disturbance of the digestion. Frequently there is gastroptosis or sagging of the stomach, and dilatation of this organ. Removal of the parathyroid glands, which are tiny structures at the back of the thyroid gland, is followed by tetany. These glands are supposed to be concerned with the calcium metabolism of the body and it is significant that in tetany there is a diminution of the calcium content of the blood.

The notable thing in tetany is excessive excitability of the nerves. This manifests itself in tonic spasms, mostly of the limbs, but sometimes of the head and trunk. These spasms may occur spontaneously or may be brought on by slight irritation of the nerves as by pressing on the nerves, or even the artery, in the arm. Tetany is treated by giving large doses of calcium chloride and by attention to the general health. Child patients are given cod-liver oil, and exposure to natural or artificial sunlight is useful. In adults the digestive apparatus should be brought into as good working order as possible. *See* Rickets.

THERMO-CAUTERY. In the instrument known as Pacquelin's thermo-cautery there is a platinum point which is first heated over a spirit-lamp and then kept hot by pumping benzine vapour through it. This cautery can be used for the removal of polypi or other growths, for arresting bleeding and for other purposes.

THERMOMETER. The instrument used for taking the temperature of the body is known as a clinical thermometer. On the Fahrenheit scale it is usually graduated between 95° and 110°, each degree also being sub-divided into fifths, corresponding to the decimal 0.2. The normal temperature of the body, 98.4°, is generally indicated by an arrow. Before taking a temperature the mercury must be shaken down well below the normal mark, and this can be done in several ways. One is to grasp the stem firmly between the thumb and forefinger and flick the instrument forcibly in the air, and another is, while holding the stem in the same way, to strike the inner side of the wrist on the knee.

The temperature is usually taken in the mouth or in the armpit, but that of a young child is commonly taken in the groin, the thigh being brought up against the abdominal wall. It can be taken in the bowel also, should the patient be unconscious.

Before a thermometer is put into the mouth it should be thoroughly washed. If the patient has just had a hot or a cold drink a few minutes should be allowed to elapse before proceeding. The patient is directed to raise the tip of the tongue, the bulb of the thermometer is placed beneath it and he is then told to keep the lips tightly closed. Before placing a thermometer in the armpit or the groin the part should be thoroughly dried and care should be taken when placing the instrument that it lies between two skin surfaces. A thermometer should be left in the mouth or the bowel for two or three minutes, and in the armpit or groin for seven to ten minutes or perhaps even longer.

THIGH. The part of the lower limb between the hip and the knee is described as the thigh. In the skeleton it is represented by the femur, and this is surrounded by massive muscles.

The main artery of the thigh, the femoral, enters about the middle of the groin and runs downwards to the inner side of the back of the knee. The great saphenous vein passes up the thigh from the leg and joins the femoral vein at the groin.

Running down the back of the thigh is the large nerve known as the great sciatic, which is sometimes affected by the painful disorder called sciatica (q.v.). *See* Biceps ; Femur ; Hip ; Knee.

THINNESS. In many people thinness is constitutional and is consistent with perfect health. But if a person starts losing weight a scrutiny of the various organs and functions of the body is an urgent matter, and the possibility of the existence of consumption, diabetes, or a malignant growth, must be considered.

THIRST. Though in general thirst is an expression of the need for replenishment of the body with liquid, it may be provoked by dryness of the pharynx when no such need exists. Mouth-breathers, for example, and those who suffer from chronic pharyngitis may have a desire to drink when liquid is not actually required, and their thirst might be relieved by simply gargling with water or even sucking a pebble. When there is a serious drain of liquid from the body there is great thirst. This happens after a large bleeding, after profuse watery diarrhoea, as in cholera, after profuse sweating and when there is a copious discharge of urine, as in diabetes. In fevers, also, thirst is usually a prominent symptom. *See* Beverages.

THOMSEN'S DISEASE. In Thomsen's disease, which is technically known as myotonia congenita, there is a delay in carrying out movements because the first attempt causes the muscles to become rigid. In from five to thirty seconds the stiffness passes off, however, and the movement is carried out. The disease is hereditary and appears in childhood. There is no cure, but warmth and freedom from excitement may help.

THORACIC DUCT. The main lymphatic channel of the body, the thoracic duct begins in the upper part of the abdominal cavity, passes through the diaphragm along with the aorta, ascends through the thorax and passes out into the root of the neck on the left side. At its commencement it presents a dilatation, about 2 in. long and $\frac{1}{4}$ in. broad, this portion being called the receptaculum chyli. The thoracic duct drains the lower part of the body, including the intestine, the left side of the chest, the left upper extremity and the left side of the head and neck. *See* Lymphatic System.

THORAX. *See* Chest.

THREADWORM. *See* Worm.

THROAT. *See* Larynx ; Pharynx.

THROMBOSIS. Clotting of the blood in the heart or a blood vessel during life is called thrombosis, and the clot that is formed, a thrombus. The primary event in thrombosis would appear to be an accumulation of the very minute particles in blood, known as the blood platelets, at some point on the wall of the heart or of a blood vessel, and it is upon the mass so formed that the clot is laid down. Adhesion of the platelets is due to some injury to the lining endothelium of the vessel, and is favoured by slowing down of the blood stream. Thus, thrombosis tends to occur in diseased arteries, but more particularly when there is an aneurysmal dilatation on an artery or when from some cause the circulation is feeble. Its occurrence in a vein is favoured by inflammation of the vein, or phlebitis, and more particularly when the vein is dilated and varicose.

The symptoms and consequences of thrombosis depend upon its site. In an artery it may shut off all the blood supply to some part of the body, and the part dies. If thrombosis occurs in a vein the venous circulation below the thrombus will be obstructed, and if the blood cannot easily make its way along other veins, as when the main vein of a limb is affected, signs of dropsy will shortly appear. The formation of the thrombus causes inflammation, and if the vessel can be felt it is found to be hard and cord-like. A thrombus may become softened, and there is then a risk that a part of the clot may be detached and cause embolism (q.v.) somewhere. On the other hand, a thrombus may be converted into fibrous or scar-like tissue.

To obviate the risk of embolism as far as possible, complete rest for six or eight weeks may be required when thrombosis has occurred. Pain may be relieved by cold or hot applications. *See* Embolism ; Pyaemia.

THRUSH. The growth of a fungus, oidium albicans, on a mucous membrane constitutes thrush. The patches usually occur in the mouth, but may spread to the throat and even to the bowel. The disorder is most common in children, but debilitated persons of any age may be affected with it. *See* Mouth.

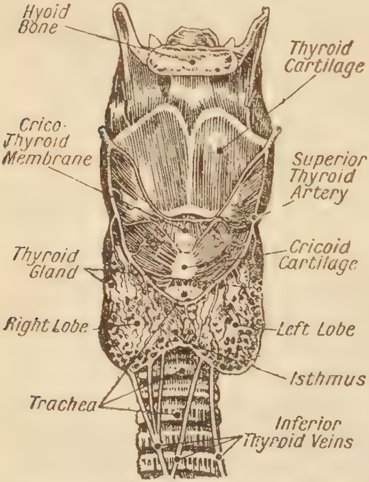
THUMB. Although there are only two phalanges, or segments, in the thumb as contrasted with three in the fingers, the thumb is much the more mobile because its metacarpal bone moves freely on the carpal bones and those of the fingers do not. The thumb muscles are supplied by the median and ulnar nerves. In dislocation the thumb is generally displaced backwards. *See* Finger ; Hand.

THYMOL. A crystalline substance obtained from the essential oil of thyme and other plants, thymol is a powerful antiseptic and in doses of ½ to 2 grains is used to combat infective organisms in the bowel. Thymol is also used to make antiseptic lotions, gargles and mouth-washes. It is contained in the compound solution of thymol of the B.P.C., which is used diluted with 3 or 4 parts of water.

THYMUS GLAND. Behind the upper part of the breastbone, and projecting above it into the root of the neck, is a structure called the thymus gland. There are two lobes, a right and a left, but there are no ducts, so that if a secretion is formed, it is an internal one. The gland grows up to the time of puberty, after which it withers, becoming replaced by fatty and fibrous tissue. Like other masses of lymphoid tissue, the thymus takes part in producing white blood corpuscles. There appears to be some connexion between it and the sex glands, as removal of the testes delays the disappearance of the thymus, while removal of the thymus causes precocious development of the testes. There may also be some connexion with general development.

An overgrowth of the thymus occurs in the status lymphaticus (q.v.), and also in some other disorders. Such overgrowth may easily be dangerous owing to pressure on the windpipe. The only treatment for this condition is removal of the gland.

THYROID GLAND. One of the important group of structures known as the endocrine glands, the thyroid consists of two lobes connected together by a narrow portion called the isthmus. Each lobe is about 2 in. long and lies by the side of the larynx (q.v.) and the upper part of the trachea. The gland is attached to the cricoid cartilage of the larynx and moves upwards with the larynx in the act of swallowing. The blood supply of the organ is unusually liberal for its size.



THYROID GLAND. Important two-lobed ductless gland lying in front of the trachea

The thyroid secretion, from which a substance containing about 60 per cent of iodine has been extracted, is absorbed by the lymphatics and blood vessels. Its great importance in controlling the metabolism and growth of the body is demonstrated by the fact that a congenital deficiency in the thyroid causes cretinism, while a deficiency occurring in adult life leads to myxoedema. Fortunately any such deficiency in the thyroid gland can be made good by feeding the patient on the extract of the thyroid gland of animals. The extract is even effectual in reducing the weight in ordinary obesity, but as it is a very powerful agent, has to be handled very carefully. Overdosage causes restlessness, headache, insomnia, a very rapid pulse and other symptoms. An excessive activity of the gland occurs in the disorder known as exophthalmic goitre (q.v.). Any enlargement of the thyroid gland is commonly referred to as goitre. But it must be noted that diminishing or excessive functioning of the gland may produce symptoms so slight as to be overlooked. *See* Cretinism ; Endocrine ; Exophthalmic Goitre ; Goitre ; Myxoedema.

TIBIA. The shin-bone, or tibia, is the larger of the two bones of the leg. The shaft is prismatic in shape, one of the edges being directed forwards and forming the shin. This and the inner edge can be easily felt as the surface of the bone between them is covered by skin simply. The bone is expanded at its ends ; the upper one helps to form the knee joint and the lower one that of the ankle. *See* Fibula ; Leg.

TIC. A recurring twitch of a muscle or a group of muscles may be an instance of a habit spasm, or tic. Such occurs in a child, usually one with a nervous constitution, and is more common in girls. It begins most frequently between the ages of seven and fourteen. It may follow some acute disease or a fright and is sometimes induced apparently by nasal obstruction, eye trouble, decayed teeth, or some other kind of local irritation. The tic can generally be suppressed by force of will, but this causes considerable distress and often the tic is aggravated after such an experiment. It is increased also by excitement. In the early stages a tic can usually be cured without great difficulty, but if it persists for some time it is doubtful if anything can be done. The general health should be improved where necessary, and any source of irritation should be dealt with appropriately. It is necessary also to investigate the mental condition.

TIC DOULOUREUX. A painful type of neuralgia occurring in branches of the 5th cranial nerve is known as tic douloureux. Most often there is pain above or below the eye or in the eyeball itself, but it may extend to the upper or the lower jaw. Generally the disorder is on one side only. The paroxysms are very severe and cause twisting of the face on the affected side. There may be a free flow of tears or of saliva and there may be flushing and a sensation of fullness.

The disease almost always begins after thirty-five years of age and its causation is obscure. Some local source of irritation is sometimes blamed, such, for example, as carious teeth, but often enough even good teeth have been extracted without the slightest benefit. The usual remedies for neuralgia (q.v.) are tried ; aspirin, phenacetin, arsenic or quinine or combinations of these are sometimes of use. Gelsemium and butyl-chloral hydrate are even more powerful. The injection of alcohol into branches of the nerve or even into the Gasserian ganglion may be adopted when the disease is intractable. *See* Neuralgia.

TICK. In the spider class of animal are included the ticks, creatures which lurk in undergrowth and herbage but make their way from time to time on to the bodies of men or the lower animals for the purpose of feeding on blood. Relapsing fever in Equatorial Africa and Madagascar is called tick fever, as it is carried from one person to another by a tick. Mountain fever, or the spotted fever of the Rocky Mountains, which seems to be identical with typhus, is also carried by a tick.

TINNITUS. *See* Noises in the Ears.

TISSUE. A considerable number of different tissues go to the make-up of the body, but they can all be included in four groups, namely, nervous tissue, muscular tissue, epithelial tissue and connective tissue. Essentially, any tissue consists of cells and an intercellular substance, though the characters and the relative proportions of each of these may vary.

A cell consists of a mass of protoplasm containing a nucleus. The nucleus is surrounded by a membrane and within it there is contained a tiny rounded body known as the nucleolus ; sometimes there is more than one. Cells multiply by dividing.

Nervous tissue is discussed under the heading Nervous System, muscular tissue under that of Muscle, and epithelial tissue under that of Epithelium. There are several varieties of connective tissue, including jelly-like tissue, fibrous tissue, cartilage, bone and blood. In these the cells and the intercellular tissue differ in character. In blood the latter is constituted by the plasma. Cartilage, or gristle, consists of a ground substance in which numerous cells and sometimes fibres, white or yellow elastic, are disposed. Bone is developed from one type of cartilage. Fibres first form, and round these lime salts are deposited. In the dentine, of which teeth are formed, and which resembles bone, mineral salts have also been laid down. A type of connective tissue, known as areolar tissue, which occurs in the subcutaneous tissue, in the sheaths of organs, nerves and blood vessels and elsewhere, consists of cells, ground substance and fibres, both white and yellow. Adipose or fatty tissue consists of areolar tissue in which cells have become swollen with fat. *See* Blood ; Bone ; Cell.

TOBACCO. The tobacco leaf contains an oily alkaloid known as nicotine which is freely soluble in water and alcohol and is volatilised by heat so that it occurs in tobacco smoke. Most occurs when tobacco is damp, so that a bigger dose of alkaloid is obtained from the smoke of a dirty pipe, in addition to what is swallowed in the moisture sucked from the pipe. When tobacco is burned certain volatile substances are produced, the most important being carbon monoxide, pyridine and ammonia. The poisonous effects of tobacco are due to the nicotine and the carbon monoxide and may manifest themselves on a first trial of the drug in giddiness, nausea, vomiting, and profuse sweating and perhaps diarrhoea. With continued use of tobacco, however, tolerance is acquired and there are no such unpleasant effects ; on the other hand, there may be a stimulating effect on the brain and at the same time a sedative one, so that work may be done more easily and worry and excitability may be lessened.

Although for the mature smoking may have undoubted advantages, there is an almost unanimous medical opinion against juvenile smoking. Even adults may sustain damage if they use tobacco immoderately. Tobacco diminishes the sense of hunger and an excessive use may impair appetite and digestion. It may also cause spasm of the pyloric end of the stomach and hyperchlorhydria, which in turn may lead to the development of a duodenal ulcer. Excess in tobacco may cause instability of the heart and a quickening of its action, a condition sometimes described as the tobacco heart. It is the cause also of the spasmodic contraction of the arteries of the limbs in some of the victims of the disorder known as intermittent claudication. It may cause headache and perhaps induce insomnia. There is an impairment of vision referred to as tobacco amblyopia. There is first a diminution in the power to distinguish the colours of small objects, and a blunting of the sharpness of outlines. If tobacco is not given up ability to read and do similar near work may be permanently lost. Excessive smoking may cause inflammation of the mouth, nose, and throat, and there may be a serious diminution of the sense of smell.

TOE. Each of the toes consist of three segments, or phalanges, except the first, or great, toe, which has only two. Disorders and deformities of the toes are mainly due to improperly designed boots and especially to the pointed boot. By this the great toe is pressed outwards and in time remains in this position, described as hallux valgus (q.v.). To relieve pressure on the head of the metatarsal bone to which the toe is jointed a bursa forms, but this may become inflamed and swollen, forming a bunion. An X-ray photograph showing dislocation of the great toe is given in Plate 22. *See* Corn; Foot; Hammer Toe.

TOLU. Balsam of tolu is a fragrant substance which is used as an expectorant. There is a syrup and a tincture, the dose of each being ½ to 1 drachm.

TONGUE. The substance of the tongue consists almost entirely of iterlaced bundles of muscle-fibres, and called the intrinsic muscles of the tongue. The other muscles of the tongue, the extrinsic set, connect the organ to the lower jaw, the hyoid bone and the soft palate. The tongue is covered with mucous membrane. Its upper surface is called the dorsum, and presents towards the back a V-shaped formation of red spots, slightly elevated. About two-thirds of the dorsum lie in front of the V, and its mucous covering has a different appearance from that of the remaining third. This is studded with lymphoid nodules, but the mucous membrane of the anterior two-thirds is thick and rough from the presence of an immense number of elevations, or papillae. The red spots of the V-formation represent another kind of papilla known as the circumvallate, because each is surrounded by a tiny, moat-like depression. In the covering of these circumvallate papillae are specialised cells, grouped in bundles, which are known as taste-buds.

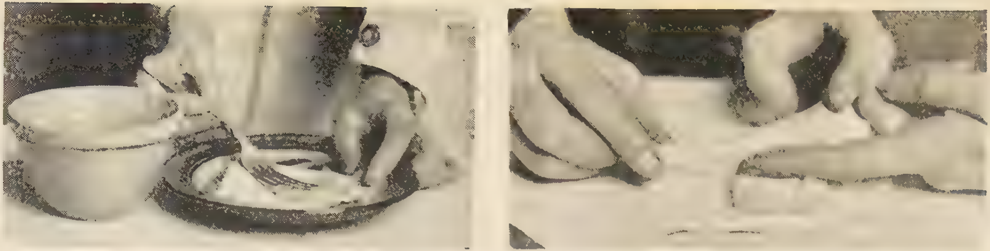
The back part of the tongue is bound down to the floor of the mouth by structures which together represent what is called the root of the tongue. In front of this the tongue is free and presents an under surface which has a smooth covering, however, as contrasted with what obtains on the dorsum. Part of the smooth covering is prolonged forwards in the middle line to make a fold, and this is known as the frenum of the tongue. Sometimes it comes too far forward and is shorter than usual, so that the movements of the tip of the tongue are hampered. This condition is popularly called tongue-tied, and can easily be remedied.

The tongue is normally pink in colour, moist and clean and, although it seems to be normal for some individuals to have a little fur on the tongue, the presence of fur points, as a rule, to indigestion, bad teeth or some other local or general disorder. Fur consists of moulds and other organisms with epithelial débris and particles of food.

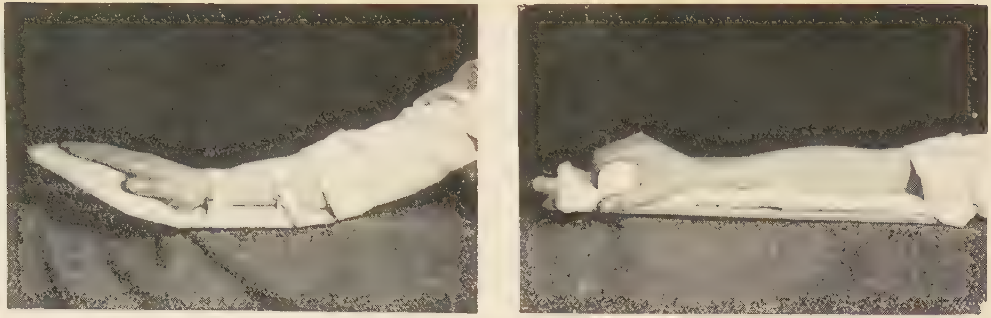
A wound of the tongue may give rise to free bleeding. It may be possible to arrest this by grasping the tongue with the fingers and stitching the wound, but it is sometimes necessary to tie the lingual artery in the neck. Inflammation of the tongue is called glossitis, and may be superficial or deep. If the latter, the swelling may be considerable, more particularly if an abscess should form, and breathing may be obstructed. An immediate free incision is required to liberate any pus. Acute superficial glossitis may be caused by excessive smoking, drinking hot or pungent liquids or some infection. There is swelling and pain. Diet should be restricted to bland, cool liquids, and a bland mouth wash used, say a weak solution of borax or of permanganate of potassium. Smoking should be discontinued. Chronic superficial glossitis may follow acute attacks, or may come on insidiously. Syphilis is the commonest cause. Ulceration of the tongue is often caused by a jagged tooth, but may be due to syphilis or tuberculosis, or to cancer. Cancer occurs fairly frequently, especially in men. At the beginning it may resemble a wart or only a slight thickening of the surface of the tongue, and may be quite painless. Later it ulcerates, and probably becomes infected by bacteria. The glands under the jaw become enlarged. The growth should be removed in its earliest stage by operation. *See* Ranula; Salivary Gland; Speech; Taste.

TONIC. The purpose in view in giving a tonic is ultimately that of increasing the tone of the muscles and thus developing vigour. Iron is given as a blood tonic, for instance, and when it improves the quality of the red blood corpuscles there is necessarily an improvement in the nutrition and therefore in the tone of muscles. Bitters and other drugs are given as digestive tonics, and here again an improved digestion makes for a better nutrition of muscles. Digitalis is given as a heart tonic and is entitled to the designation as it definitely improves the tone of the heart muscle. *See* Easton's Syrup; Iron; Nux Vomica.

TONSIL. A mass of lymphoid tissue situated on either side of the back part of the mouth, the tonsil varies in shape and size in different individuals. It is relatively large in childhood, but

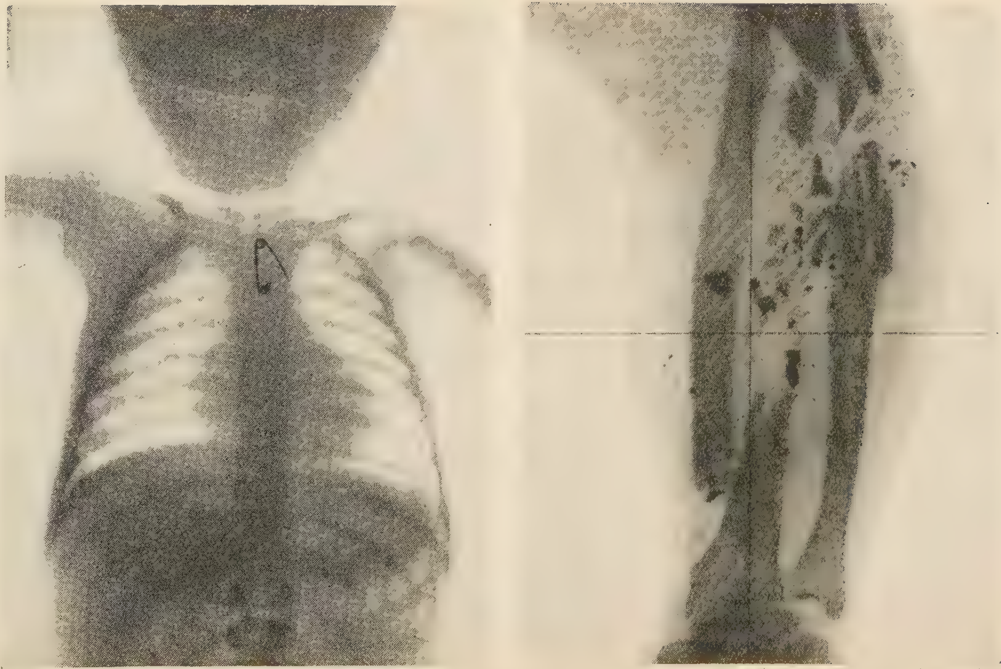


Whitlow. Affected finger treated with a poultice made of bread and a little boracic acid powder



Wrist Drop. Two preventive methods both of which consist in keeping the hand bent backwards

METHODS OF TREATING A WHITLOW AND A WRIST DROP.



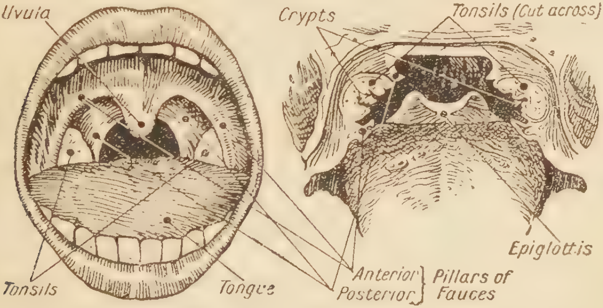
The wonderful rays, which can pierce the body, have done much to simplify the surgeon's task when operating. The illustration on the left shows how the X-rays have detected a safety pin in the gullet, and the one on the right the extent of bone injuries resulting from a bullet wound

HOW THE X-RAY REVEALS THE HUMAN BODY

in elderly people usually shrinks to very small dimensions. On its surface there are from twelve to fifteen depressions representing the openings into the passages, or crypts, that run more or less deeply into its substance. For its size the tonsil is very freely supplied with blood vessels, and its main function appears to be that of trapping toxic material as it passes from the mouth.

DISEASES OF THE TONSIL. The tonsil is the usual first site of diphtheritic infection and is probably the usual door of entrance of the germs of scarlet fever and of acute rheumatism. It is one of the routes by which tuberculosis invades the system.

TONSILLITIS. Inflammation of the tonsil, or tonsillitis, may assume several forms. The tonsils may be involved in the catarrhal inflammation of the throat that occurs in a common cold, but types of acute inflammation occur in the tonsil itself. The first is called acute follicular tonsillitis. The inflammation is superficial and the tonsil is swollen and reddened, but dotted over it are yellowish spots, caused by the accumulation of inflammatory products in the crypts. The second type is called parenchymatous tonsillitis, that is, inflammation in the substance of the tonsil, and a third is called peritonsillitis, as the inflammation occurs mainly in the connective tissue around the tonsil. These two types are sometimes called quinsy. Peritonsillitis usually ends in suppuration, and the matter presses the already swollen tonsil inwards. The fourth type is that of acute ulcerative tonsillitis. Vincent's angina is a form of ulcerative tonsillitis in which a membrane appears on the tonsil and may extend.



TONSIL. Left, relative position of the tonsils. Right, tonsils cut across, showing the crypts which may harbour infective microbes

Acute tonsillitis begins with stiffness in the throat and pain in swallowing. The temperature shoots up and is usually high; sometimes there is chill or even a definite rigor. There may be headache and pains in the back and limbs. The tongue is furred, and there is constipation. Pain increases, especially in quinsy, and may shoot into the ear. The glands below the angle of the jaw becomes wollen and painful. Tonsillitis cannot be properly treated unless a correct diagnosis has been made, and the possibility of diphtheria ruled out. The abscess in quinsy will burst in time, but it should not be allowed to do so, as the patient's sufferings can be curtailed by opening it. To relieve pain, hot fomentations or poultices may be put to the throat and steam may be inhaled from a jug of hot water. The addition of a teaspoonful of Friar's balsam to the water in the jug is a distinct advantage. Sprays containing menthol are soothing. Ice may be sucked, especially before the patient drinks, as swallowing will be rendered easier. The bowels should be kept freely open by salines in the morning. Doses of sodium salicylate, or of aspirin, help to relieve pain and are necessary if there is any question of acute rheumatism.

In follicular tonsilitis the following gargle should be used:

Potassium chlorate	90 grains
Tincture of perchloride of iron	2 drachms
Glycerin	4 drachms
Chloroform water	to 6 ounces

A tablespoonful in a little water to be gargled and swallowed thrice daily. This is the dose for an adult.

A chronic enlargement of the tonsils is common in children, and is generally associated with adenoids. If the diseased structures are allowed to persist, not only do they interfere with breathing, but they act as foci of infection. A frequent result is enlargement of the glands in the neck owing to tuberculous infection. The correct treatment for diseased tonsils is to have them removed. *See* Adenoids; Angina; Diphtheria.

TOPHUS. *See* Gout.

TORTICOLLIS. *See* Wry Neck.

TOUCH. Knowledge of something being in contact with a surface of the body is derived through the special tactile, or touch, sense. Special nerve endings receive the tactile impressions, and the nerve-impulses run along special fibres and in special tracts in the spinal cord Sensitiveness to touch varies greatly on different surfaces of the body. Certain minute areas on the skin are concerned with tactile reception, while others are concerned with receiving sensations of temperature or pain. Loss of the sense of touch, or anaesthesia, may be noted in many disorders. *See* Hyperaesthesia; Sensation.

TOURNIQUET. An instrument used for arresting or preventing bleeding, a tourniquet consists essentially of a pad for placing over the artery and an appliance for pressing the pad down on the artery. An improvised tourniquet is made by tying a folded handkerchief or triangular bandage loosely on the limb, placing a pad beneath the bandage and over the artery and passing a stick under the bandage and screwing it round until the pad is pressing sufficiently tight on the artery. The stick is prevented from slipping by tying another bandage round it and the limb. A sufficient amount of pressure has been applied when the bleeding stops or there is a cessation of pulsation in the arteries below the tourniquet. A tourniquet must be applied where it is possible to compress an artery, that is, on the thigh for the lower limb and on the arm for the upper. A tourniquet should not be left tightly applied for longer than half-an-hour at a time, otherwise the tissues that are deprived of blood may die. *See* Bleeding; Ligature; Styptic.

TOXAEMIA. *See* Pyaemia; Septicaemia.

TRACHEA. The main airway into the lungs, the trachea, extends from the lower border of the cricoid cartilage of the larynx to the level of the second piece of the breast-bone and is about 4½ in. in length. It consists of a membranous tube which is strengthened by the inclusion of about twenty cartilaginous rings. Behind the trachea is the gullet. In front of the 2nd, 3rd and 4th rings is the isthmus of the thyroid gland.

The tube may be obstructed by compression from without in strangling or garrotting; or by a foreign body which manages to pass through the larynx; or by a foreign body in the gullet. The trachea forks at its lower end into the right and left bronchial tubes, as shown in the illustration in page 604. In the operation called tracheotomy a vertical opening is made into the trachea.

TRACHOMA. *See* Conjunctivitis.

TRAGACANTH. A gummy exudation from certain leguminous trees, tragacanth forms a mucilage on the addition of water. It may be used as a demulcent in sore throat.

TRANSFUSION. After a severe haemorrhage, or in serious forms of anaemia, it may be considered necessary to transfuse blood into the patient. This is done by withdrawing blood from a volunteer, described as the donor, and then allowing the blood to run into one of the patient's veins. It has been found that the blood of one person may not be compatible with that of another in that it causes a destruction of the red corpuscles. From tests it would appear that in this respect human beings can be divided into four classes. There is a class which can take blood from any other person, and these are known as universal recipients. There is another class whose blood is compatible with that of any other person, and these are known as universal donors. Then there are two classes whose blood is only compatible with that of their own class or with that of a universal recipient.

Often it is considered sufficient to transfuse with normal saline solution instead of blood. *See* Normal Saline Solution.

TRANSPORT OF THE SICK AND INJURED. Not only does a proper method of carriage make a patient more comfortable, but a haphazard and unskilful method may aggravate his condition, perhaps to the extent of endangering life. The choice of a method will depend on the nature of the injury or illness, the number of bearers available, the appliances at hand, the nature of the route and the distance to be traversed. Should the injury or sickness be of a serious nature, it is desirable that a patient should be seen by a doctor before he is moved at all beyond what is necessary to keep him clear of risks from machinery or otherwise. When a bone has been broken the fracture should be secured by splints or bandages, when such will suffice, before any attempt is made to move the patient. When there is a fracture of a lower limb or an injury to the spine, it is necessary to use a rigid stretcher.

When a patient is unconscious, and must be moved at once, owing to fire or some other danger, and there is only one bearer, or it is necessary to go down a ladder, the best method is that known as the fireman's lift. The patient should be lying on the face. The bearer stoops opposite the patient's head and raises him into a kneeling position. He now places his right shoulder against the patient's body about the middle and carries the patient's right arm behind his own neck. Then he places his right arm between the patient's thighs—or, if it is a woman, round both thighs—grasps the patient's right wrist and rises. The bearer's left hand is thus left free for support (*see* Plate 56).

When a patient is able to walk, a single bearer can afford him assistance by taking the patient's right or left arm over his own shoulders and grasping him round the middle with his other hand. By inclining his body away from the patient, the bearer can take much of the weight off the patient's legs. Another method of removal by a single bearer is to carry the patient pickaback. When two bearers are available, the fore-and-aft method may be adopted. One bearer supports the head and trunk by placing his hands beneath the patient's armpits and clasping them in front of his chest, while the other places himself between, and carries, the thighs. Should a leg have been injured a splint is put on, the legs tied together and carried in the arms of the first bearer (Plate 57).

If, however, the patient can sit up, he may be carried by making one of the so-called seats. The bearers face each other. To make a two-handed seat, the right bearer bends the fingers of his right hand to make a hook, and the left bearer does the same with his left hand. They then hook the hands together and each places his free hand on the haunch of the other, thus making a back to the seat. To make a three-handed seat, the right bearer grasps his left forearm with his right hand and with his left hand the left forearm of the other bearer, who, with his left hand, grasps the right forearm of the right bearer. The left bearer then puts his free hand on the shoulder of the right bearer. To make a four-handed seat, each bearer grasps his own left wrist and the right wrist of his neighbour (Plate 54). In carrying the patient, the bearer crosses his legs one in front of the other, the right bearer moving off with the left foot, and the left bearer with the right foot. A broken step minimizes swinging.

For long distances resort must be had to a stretcher. There are various models, but each consists of two poles, made of light wood as a rule, between which canvas, usually tarred, is stretched, and with hinged iron bars, beneath the poles, to keep these apart when the stretcher is loaded. A stretcher may be improvised by rolling up poles of suitable length in the sides of a blanket until a width of the blanket of about 2 ft. remains (Plate 46), and fixing the corners of the blanket to the poles by tying with bandages or handkerchiefs. Another method is to turn the sleeves of two coats outside in, pass the poles through the sleeves and button up the coats. In either case cross-pieces of wood must be tied on at the ends in order to keep the poles apart. When the patient suffers from a spinal injury, a stretcher can be improvised in a door or a strong hurdle.

For loading a stretcher, three bearers place themselves on the left side of the patient, kneel on the left knee, and raise the patient on to their right knees. Another bearer then places the stretcher beneath the patient, and he is gently lowered on to it (Plate 55). A patient with a broken leg is placed so as to incline somewhat towards the injured side, but a patient with an injured arm should incline towards the sound side. A patient with a wound across the abdomen should have his legs well bent up at the knees, one with a vertical wound should have them extended.

Generally speaking, the patient is carried feet foremost, but when ascending a hill, or going upstairs, the head-end of the stretcher should go first except where the patient has a broken leg, as the weight of the body in this instance might cause displacement of the fragments of the bone. A stretcher should always be kept as level as possible. A carrying-chair forms a convenient means of taking a patient about the house or out-of-doors. One can be improvised by procuring two stout poles, sufficiently long to project about 18 in. in front of and behind a light easy chair, and attaching the poles to the legs of the chair just below the seat by loops made of straps or bandages. *See* First Aid.

TRICHIASIS. The eyelashes grow normally outwards, away from the eye, but from inflammation of the lids they may come to be directed inwards so that they rub against the cornea. This condition is called trichiasis and causes inflammation of the eye. The offending lashes should be pulled out.

TRICHINOSIS. *See* Worm.

TRIGEMINAL NERVE. The 5th cranial, or trigeminal, nerve contains both sensory and motor fibres. The motor fibres activate the muscles of mastication. On the sensory part of the nerve is a large ganglion, the Gasserian, situated within the skull behind the orbit, and from this ganglion three main divisions of the nerve pass out, each furnishing numerous branches. Irritation of one branch of the nerve may cause pain to be referred to the distribution of some other branch. *See* Gasserian Ganglion ; Tic Douloureux.

TROCHLEAR NERVE. The 4th cranial, or trochlear, nerve supplies the superior oblique muscle, the action of which is to turn the eyeball downwards and outwards. *See* Eye.

TROPICAL HYGIENE. For the maintenance of health in the tropics not only must the ordinary hygienic laws regarding diet, clothing, housing, etc., be observed, but extra precautions must be taken against possible dangers from the excessive sunlight and heat, from uncooked food and water, and from insect bites. Clothing must be light for the sake of coolness, but it must be absorbent in order to minimise the risk of chilling from dampness of the clothing. Thin woollen, mixed wool and cotton or cellular cotton garments should always be worn next the skin, and an abdominal belt should be worn at night. A solar topee should be worn when in the sun, and sometimes a spinal pad will also be necessary. The nape of the neck should be shaded. The eyes should be protected from the glare of the sun by tinted glasses.

A hot, dry climate is more easily borne than a hot, moist one, even though the temperature of the latter be not as high. Alcohol is dangerous when the sun is up, and greater temperance is required in the tropics than in a temperate climate. Salads are inadmissible as a rule, and care must be taken that fresh fruit is sufficiently, but not over, ripe, as diarrhoea may be caused by unsuitable fruit and expose to a risk of dysentery and cholera.

All the water used for drinking or for washing food utensils should be boiled, and when water is drawn from pools it should be boiled even for personal washing, as there is a risk of acquiring bilharzia from bathing in such water. Cold baths are not safe for tropical residents owing to the increased susceptibility to chill, but frequent bathing is desirable. Water should be drunk freely. *See* Malaria; Mosquito; Tick.

TRUSS. One of the instruments used for retaining a hernia, or rupture, is called a truss. The common type consists of a piece of flat steel spring, covered with leather and with a firm pad at one end to fit over the opening through which the hernia would emerge. On the outer side of the truss the leather is prepared leather, but on the inner side it is wash leather. The pad is shaped according to the variety of hernia being treated. Care should be taken in the fitting of a truss.

For children an all-rubber truss with an inflatable bag instead of a pad is the most comfortable. The truss must always be kept clean and should remain on during the bath. It may be removed while the infant is being dried and a dry one is applied, but while the truss is off the nurse must keep her hand over the rupture so as to prevent its coming down should the infant cry. *See* Abdominal Belt; Hernia.

TRYPANOSOMA. A genus of animal micro-organism, belonging to the protozoa, is known as trypanosoma, and species are found living as parasites in man and animals. Infection with the parasites is called trypanosomiasis. *See* Sleeping Sickness.

TRYPSIN. *See* Digestion.

TUBERCULOSIS. An infectious disease, characterised by the occurrence of minute rounded bodies known as tubercles, to which circumstance it owes its name, tuberculosis is caused by an organism known as the tubercle bacillus. In human tuberculosis two types of bacillus are found, the human and the bovine. A tubercle consists of a mass of cells of different kinds, which accumulate around bacilli, and in consequence of the irritation caused by the latter. Tubercles tend to aggregate and form considerable masses which replace the healthy tissues. Soon, however, the cells in tuberculous tissue begin to degenerate, and it comes to form a yellowish-white cheesy mass. This is described as caseation. Then this caseous matter may soften and give rise to a tuberculous abscess. Should, however, the resistance of the body to the disease process be sufficient, the caseous matter may not form, or may disappear, and be replaced by fibrous tissue, or lime salts may be deposited in the mass. This is called calcification.

The chief sources of tuberculous infection are the sputum of persons suffering from consumption (q.v.) and cow's milk. Much of the cow's milk that is purveyed to the public contains the bovine type of bacillus, and is a source of a large proportion of the tuberculosis occurring in young children. Meat may also contain bacilli, but is much less dangerous, as it is cooked before being consumed.

Tubercle bacilli that are inhaled may pass directly into the lungs, but usually are absorbed through the lining of the mouth or throat, and especially through the tonsils, or are swallowed and absorbed through the lining of the bowel. The last happens also when infected food is swallowed. When bacilli are absorbed, they are carried to the nearest lymphatic glands, and if they are in sufficient numbers they cause inflammation and swelling of the glands. From one set of glands the bacilli proceed to the next in the chain, and so onward to the main lymphatic drainage channels, through which they are poured into the blood stream. By the blood they are carried to various organs, where they may settle and form tubercles. Sometimes there are such swarms of bacilli in the blood as to constitute a septicaemia, and tubercles are formed all over the body. This is acute miliary tuberculosis.

Tubercle bacilli set free a poison which causes local irritation, but more or less of it is carried throughout the body, and produces fever, anaemia, loss of flesh, and other symptoms. The symptoms of tuberculous infection consist of those due to the toxaemia, and of those proceeding from the damage to particular organs, and the latter will vary with the acuteness of the attack and the amount of the damage. Tuberculosis of the lungs, dealt with under the heading Consumption, most commonly manifests itself first in adolescence. Abdominal tuberculosis is most common between the ages of two and three, an age incidence which fixes the chief responsibility for causation on infected milk. Meningitis is most common between the ages of two and five. Disease of bone and joints is commonest between the ages of three and fifteen, and the spine is frequently affected. Some skin diseases, like lupus and scrophulodermia, are caused by the actual invasion of the skin by bacilli.

The problem of the prevention of tuberculosis must be attacked along various lines. Persons suffering from the disease in an infectious stage must dispose of their sputa in such a way as to prevent danger to others. When the accommodation at home is insufficient to permit of precautions being taken against the spread of infection, the patient should be treated in a suitable institution. Attempts must be made to secure a pure milk supply, though any risk from this source can be removed by boiling milk before use. An adequate supply of good food at a price that can be afforded by the humblest is an end which should be strenuously striven for, as this has a lot to do with the matter. Notification, disinfection of premises, meat inspection, the destruction of flies, and other activities also contribute towards the prevention of the disease.

In the general treatment of tuberculosis, sunshine, fresh air and feeding are the important elements, but in the acute stage of the disease, wherever it occurs, rest is equally important. Tuberculosis of the glands, bones and joints is sometimes referred to as surgical tuberculosis because surgical treatment was at one time the rule for such, but nowadays the surgeon is more inclined to stay his hand and trust to rest and light, the last either natural or artificial (*see* Plate 58), for a time, and only operating for the removal of glands or other diseased structures when a sufficient trial of the other methods has proved ineffectual. *See* Consumption ; Light ; Lupus ; Pott's Disease.

TUFFNELL'S DIET. A diet sometimes used in aneurysm is known as Tuffnell's diet. It consists of 2 oz. of bread and butter and 2 oz. of milk or cocoa for breakfast ; 3 oz. of cooked meat, 3 oz. of bread or potato and 4 oz. of water or light claret for dinner ; and 2 oz. of bread and butter and 2 oz. of milk, tea or cocoa for supper. It is seldom, however, that a patient can endure this restriction of liquids for long.

TUMOUR. The literal meaning of the word tumour is a swelling, but in pathology its application is restricted to those swellings formed of cells resembling ordinary tissue cells but developed independently of the factors regulating normal development and serving no useful purpose. A tumour may develop in tissue which it resembles, as, for example, an osteoma or bony tumour in bone, but tumours composed of alien tissues may occur in certain structures.

The causation of tumours is not understood. There is a large class which exercise no harmful effect on the body except by the pressure caused by their growth. A tumour of this kind is called a simple, benign or innocent tumour and can generally be left alone, removal only being required when it is disfiguring or presses on a vital organ, or when it is in such a position that it is being irritated by friction. The other class of tumour comprises the malignant tumours. A tumour of this type not only presses on neighbouring tissues but actually invades and destroys them. Moreover, small portions of the tumour-tissue make their way along lymphatics or veins into other tissues or organs. Also, the growth of such tumours causes a depreciation of health, and in time proves fatal. In this class, commonly described as cancer, are included the carcinomata and the sarcomata. Such tumours should be removed at the earliest possible moment. *See* Cancer; Polypus; Sarcoma.

TURPENTINE. Oil of turpentine is distilled from an oleoresin obtained from pinus sylvestris and other pines. It is a colourless liquid with a characteristic smell and a pungent taste. There are two official preparations, turpentine liniment and acetic turpentine liniment, and if either is thoroughly rubbed into the skin it is quickly reddened and a sense of warmth is produced. Pain may thus be relieved in muscles or joints or the discomfort in the chest caused by bronchitis. Another way to use turpentine is to sprinkle it on a fomentation. Old oil of turpentine is used as an antidote in phosphorus poisoning, ½ drachm doses being given every hour.

TYMPANITES. Distension of the abdomen with gas or air is called tympanites; it also goes by the name of meteorism. The gas or air may be in the intestine or in the peritoneal cavity. It gains admission to this cavity through a rupture of the stomach or gut. It is more likely to accumulate in the gut if the muscle fibres in the wall of the latter are weakened or paralysed. Hence tympanites occurs in general peritonitis and in the intestinal paralysis that sometimes follows an abdominal operation. It is common also in typhoid fever. Occasionally it is a manifestation of hysteria.

Medical advice should be obtained without delay. Meanwhile an attempt may be made to relieve the patient by putting turpentine stupes on the abdomen, and, if necessary, giving him an enema of soap and water containing a tablespoonful of oil of turpentine. Aromatics by the mouth may also be useful.

TYPHOID FEVER. An acute infectious disease in which the small intestine is specially affected, typhoid or enteric fever is caused by an organism known as the typhoid bacillus, or bacillus typhosus, or Eberth. The bacillus is found in the blood and in numerous organs of persons suffering from the disease. It is also found in the faeces and urine, and may persist in those discharges for many years after recovery from the disease. A person who harbours the bacilli in this way is called a carrier.

The chief source of infection is water that has been polluted with the discharges of a typhoid patient or carrier. If polluted water is used to wash milk containers or utensils, the bacilli multiply readily in the milk; this becomes highly infectious and also the cream or cheese made from such milk. Freezing does not kill the typhoid bacillus, and ice-cream made with infected milk or cream can readily communicate the disease. Salads polluted by sewage or washed with infected water are also dangerous. Another common source of typhoid infection is the oyster, as these molluscs are sometimes bred in water which is polluted with sewage. For the same reason mussels are sometimes implicated. Flies and other insects may likewise be agents of infection by feeding on sewage or excreta and afterwards visiting food or food utensils. Persons who handle typhoid patients or their clothing may have their hands contaminated or may inhale the germs in the dust of excrement which has dried on bedding or utensils.

After infection has occurred there is an incubation period of about twelve days. Fever then begins, the temperature each evening being higher than on the preceding one. During this time the patient suffers from loss of appetite, headache, vague abdominal pain and slight diarrhoea or, perhaps, constipation. Frequently there is bleeding from the nose, and bronchitis is not uncommon. The temperature reaches its acme on the fifth to the seventh day, when it may be 103° to 105° F. For the next ten to fourteen days it does not vary very much, but after this, in favourable cases, it begins to come down gradually day by day. When the patient takes to his bed, diarrhoea is generally established, with thin motions, which, from their appearance, are described as pea-soup stools. There is some distension of the abdomen and pain. The tongue is covered with a yellowish fur in the centre, but is red at the tip and edges. Sometimes headache is severe. The rate of the pulse and respirations corresponds as a rule with the elevation of temperature. The spleen is enlarged.

On the seventh or eighth day a characteristic rash usually appears, first on the abdomen, chest and back, but later it may be found on the limbs and face. It consists of small rose spots, slightly elevated above the level of the skin, and these appear in crops. By the end of the second week the pulse is rapid and weak. The abdomen is more distended. There has been considerable loss of flesh, and the face is thin. If the temperature begins to decline, there is a gradual improvement in other respects also, but if the fever continues, the patient tends to develop what is called the typhoid state (q.v.). From the end of the second week there is a possibility of two serious complications occurring. One is severe haemorrhage from the bowel. Should this happen, the temperature drops to subnormal and there are signs of collapse. The other is perforation of the bowel. This also causes signs of collapse, and probably pain, and after a short time signs of peritonitis appear.

Illnesses resembling typhoid fever, but generally of less severity, are caused by bacilli which are akin to the typhoid bacillus. These illnesses are described as paratyphoid fever A, and paratyphoid fever B. There may be some difficulty in diagnosing typhoid fever in its early stages, and it is sometimes mistaken for pneumonia, acute tuberculosis, appendicitis and other disorders.

The main method of preventing typhoid fever is to provide a supply of pure water for households. There is always a danger when water is drawn from shallow wells or in a casual way from streams. Another method of lessening the prevalence of typhoid fever is the control of flies (q.v.). An important preventive measure is to discover human carriers of the disease and sterilise them if possible. In any case, such persons should not be allowed to have anything to do with preparing or handling food. Also, during an epidemic, a watch must be maintained for instances in which the disease is so mild that the patient can get about all the time. When typhoid fever is prevalent, all water used for drinking or for washing kitchen utensils, and all milk, should be boiled. Protection for two years is afforded by inoculation with anti-typhoid vaccine, and preferably one which deals not only with typhoid but paratyphoid also.

The issue of typhoid fever depends to a large extent on the quality of the nursing and in most cases it is desirable that a patient suffering from this disease should be treated in an institution. The treatment is in general that described under the headings Fever and Infectious Disease. As typhoid is such a protracted disease, however, special care is necessary in keeping the mouth clean, and in preventing bed sores. The patient should be encouraged to drink a large quantity of water, and some of this may usefully be in the form of home-made lemonade. At the same time sufficient food should be taken, mainly milk but also eggs, beaten up or as albumen water, sugar, butter, bread and cornflour, or arrowroot. A watch should be kept on the motions and if large, or many, milk-curds appear, the milk should be citrated or even peptonised.

TYPHOID STATE. In severe febrile diseases, especially if protracted, and in some instances of profound poisoning, the patient may pass into a condition of extreme prostration, which is referred to as the typhoid state. He lies on his back with the eyes open but apparently is unconscious of anything. The tongue is tremulous, dry, brown or black and cracked, the lips and teeth tend to become covered with sordes unless sedulously cleaned, the pulse is very rapid and feeble and the breathing shallow. There is low, muttering delirium going on constantly, and the patient may keep on picking at the bed-clothes or make passes in the air as if catching flies. The bowels and bladder are likely to be emptied involuntarily. This state of affairs, although highly dangerous, is not necessarily fatal, but very efficient nursing is required. Stimulants should be given skilfully, especially in the small hours of the morning.

TYPHUS FEVER. An acute infectious disease, typhus now occurs but rarely wherever there is enlightened sanitary supervision. It has long been recognised that a lack of personal cleanliness was associated with overcrowding in causing the disease, and the explanation is that such conditions favour the presence and communication of lice. The infection of typhus exists in the blood, and lice transmit it after sucking blood.

The incubation period is about twelve days and symptoms begin suddenly. In a day or two the temperature reaches its maximum of about 105° F., and there it remains for about twelve days, when, in favourable cases, it may decline somewhat, and on the fourteenth day reach the normal by crisis. The face is flushed and swollen. Mental dullness usually occurs early and, with this, delirium which may be violent. Sleeplessness is a notable feature. The tongue is large, pale and covered with fur, while the lips and teeth become covered with sordes. The pulse and respirations are rapid. On the fourth or sixth day, as a rule, the rash appears, usually first on the abdomen, or on the folds of the armpits, but later on any part of the body except the face. It consists of small, mulberry-coloured spots, which in a few days become brown. As the disease runs on, the patient becomes rapidly weaker, and may pass into the typhoid state.

The preventive treatment of typhus consists in the prevention and destruction of lice, and the prompt isolation of persons suffering from the disease, or who have been in contact with such. The usual period for contacts is sixteen days after lice have been destroyed. All the clothing of patient and contacts should be disinfected in order to kill lice and their eggs. Whenever possible, a person suffering from the disease should be taken to an isolation hospital. The general treatment of the disease is laid down under the headings Fever and Infectious Disease.

ULCER. A sore that involves the true skin or mucous membrane is described as an ulcer. It is kept open and extends by the death of minute particles of tissue which are liquefied and removed in a discharge. An ulcer consists of an area more or less depressed below the general surface of the skin or mucous membrane, which is known as its floor, and around this a margin, or edge. From the surface there exudes a discharge which may be purulent or watery and profuse or scanty. Repair of an ulcer takes place by the floor becoming filled up and covered with a layer of granulation tissue (q.v.).

Ulcers may be due to mechanical, chemical or septic irritation, to specific micro-organisms, such as the tubercle bacillus and the spironema of syphilis, or to malignant new growths. In the first group the nutrition of the affected skin or mucous membrane may be defective, owing to varicose veins or some constitutional disorder such as anaemia, diabetes, chronic Bright's disease or locomotor ataxia. An inflamed ulcer discharges freely and there is redness and swelling of the skin around it. If considerable portions of dead tissue appear it is called a phagedaenic ulcer. A callous, or indolent, ulcer is a chronic ulcer with a thickened rounded edge, the floor being pale. This kind is most common on the leg and in elderly people who suffer from varicose veins. A trophic, or perforating, ulcer is one that accompanies disease of nerves. It is quite painless. A tuberculous ulcer has a ragged, irregular margin and its floor is covered with pale granulations amongst which tiny yellow tubercles may be visible. A syphilitic ulcer is the sore left when a gumma softens and ruptures, discharging its contents. Ulcers caused by a malignant tumour are represented chiefly by the rodent ulcer (q.v.).

The treatment of an ulcer depends on its cause. If this should be malignant disease, all the diseased tissues and any glands which may possibly be infected should be removed. A tuberculous ulcer may be removed by operation or treated by artificial sunlight. A syphilitic ulcer requires anti-syphilitic treatment.

An ulcer can generally be cleaned up by applying boracic fomentations. The fomentation is made by wringing a double thickness of boracic lint lightly out of hot water, applying it and covering with gutta-percha tissue so as to overlap the lint at least half an inch all round. At the beginning it may be necessary to renew the fomentations three or four times daily, and each time the fomentation is taken off the ulcer should be washed with an antiseptic lotion. When the ulcer is clean treatment may be continued with the moistened lint without the gutta-percha tissue, but if the lint adheres it may injure the delicate epithelium that is growing in to cover the ulcer, and to obviate this a piece of oiled silk perforated with a number of openings to let out the discharge may be applied beneath the lint. The silk is first of all left for a short time in an antiseptic lotion. To obtain healing of varicose ulcers it is necessary to support the limb by applying a pure rubber bandage, a woven elastic bandage or a crepe bandage. A useful application for varicose ulcers is found in Unna's paste (q.v.). *See* Antiseptic ; Basilicon Ointment ; Duodenum ; Gastric Ulcer ; Phagedaena ; Rodent Ulcer ; Varicose Vein.

ULNA. The inner of the two bones of the forearm is called the ulna. Its shaft is somewhat prismatic in shape but the bone is enlarged at the upper end where it forms a notch to grasp the lower end of the humerus. The notch extends between the olecranon process above and the coronoid process below. On the outer side of the coronoid process is a shallow depression for articulation with the head of the radius. The lower end of the shaft is cylindrical and articulates with the radius and with the wrist bones. Fracture of the bone is easily recognised. *See* Radius.

ULNAR NERVE. The ulnar nerve lies near the brachial artery in the upper part of the arm but leaves it to reach the back of the elbow where it lies in the groove between the inner prominence of the lower end of the humerus and the olecranon process of the ulna. It then passes on to the front of the forearm for the greater part of its course in company with the ulnar artery, and ends in branches to the back and front of the hand. It supplies sensation to the palm and back of the hand on the inner side and to the little finger and half of the ring finger. The nerve is quite superficial at the back of the elbow and a blow on it or on the bone causes a peculiar sensation to shoot down the forearm, a fact which has given the name funny-bone to this part. *See* Arm ; Median Nerve ; Musculo-spiral Nerve ; Neuritis.

UMBILICUS. The navel, or umbilicus, is a depressed scar left after the separation of the umbilical cord. A hernia sometimes occurs in this situation and should be prevented from emerging by a circular pad, kept in position by a broad band.

UNCONSCIOUSNESS. An unconscious person should be placed on his back, with the head to one side and slightly raised or not according as the face is flushed or pale. The clothing about the neck and chest should be loosened. A doctor should be summoned. The state of consciousness may be tested by opening the eyelids and touching the white of the eye. If the patient is at all conscious he will wince.

The causes of unconsciousness may be summarised briefly as follows: (1) Death; there is no evidence of the beating of the heart or of breath. (2) Fainting or syncope; (3) Asphyxia; the face shows some lividity and the circumstances suggest the nature of the condition. (4) Apoplexy; the breathing is stertorous and relative weakness may be discernible on one side of the body. (5) Epilepsy; there may be signs of the patient having had a fit. (6) Heat stroke; the atmospheric temperature will be suggestive and the skin will feel burning hot. (7) Poisoning by narcotics, such as alcohol, opium, etc. (8) Injuries to the head. (9) Shock or collapse; there may be evidence of injury or of internal bleeding. (10) Poisoning in diabetes or uraemic poisoning from kidney disease; such conditions could only be recognised by an expert, as also unconsciousness due to meningitis or other diseases of the brain. (11) Cold. (12) Shock from lightning or electricity. (13) Hysteria, including the death-like condition known as trance.

It should not be too readily assumed that a person is dead, as other conditions simulate death very closely. A smell of alcohol from the patient should be ignored unless the possibility of some other cause of unconsciousness is definitely excluded. A scalp wound does not necessarily mean that unconsciousness is due to a brain injury, as a person who becomes suddenly unconscious may strike his head in falling.

No attempt should be made to give an unconscious person alcohol, and this should be withheld even if the patient recovers sufficiently to be able to swallow, unless possibly after a simple faint. Not even water should be given until the patient can swallow, and his ability to do so should be first tested by giving a few drops at a time. If breathing ceases, artificial respiration should be carried out. If the patient begins to vomit the head should be turned well to one side and the opposite shoulder raised. If a bone is broken the patient should not be moved until the fracture is properly controlled by splints. An unconscious patient should be carried in a recumbent position and should be handled with great gentleness. If there has been bleeding from a wound someone should be watchful and ready to control it should it recur. *See* Apoplexy; Collapse; Death; Epilepsy; Fainting; Fit; Hysteria; Poisoning; Shock.

UNNA'S PASTE. A preparation consisting of zinc oxide, 5 parts; gelatin, 5 parts; boracic acid, 1 part; glycerin, 8 parts; and water, 6 parts, is called Unna's paste. Ichthyol, 1 or 2 parts, is often incorporated in it. The paste is mixed with the aid of heat and sets on cooling, so that it has to be warmed each time it is proposed to apply it. It is used in the treatment of varicose eczema and ulcers and other skin disorders. The part is cleansed and the paste is smeared over it and covered with a layer of gauze. This is repeated for as many layers as are desired. A layer of cotton wool is then put on, and over this a bandage.

URAEMIA. When the kidneys are disabled, waste substances, which should be excreted, accumulate in the blood and either these or substances resulting from a perverted body-chemistry, caused by their presence, give rise to symptoms of poisoning. This is known as uraemia. Headache is a common symptom, and there may be giddiness and vomiting. Sometimes the most notable thing is shortness of breath. Acute symptoms may occur after premonitory symptoms, or without warning the patient has a convulsion. This resembles an epileptic fit and is followed by coma or profound unconsciousness.

Uraemia is liable to supervene in nephritis, either acute or chronic, and in other diseases of the kidneys. The treatment of chronic uraemia is that of the chronic forms of Bright's disease (q.v.). When the acute condition occurs an attempt should be made to get rid of waste matter from the blood by inducing free-sweating and free purgation. Another method of diminishing the poison in the blood is to bleed the patient and then perform a transfusion of blood or saline, or inject the saline solution under the skin or into the bowel. A convulsion or fit is treated like an epileptic one. *See* Bright's Disease ; Kidney.

UREA. The most abundant solid in the urine is a nitrogenous substance called urea. This is formed in the liver from the nitrogenous waste substances and is found in the blood and lymph. When the kidneys are not functioning properly it accumulates in the blood. Urea is prepared synthetically in the laboratory and is administered as a diuretic.

URETER. The tube that conducts urine from the pelvis of the kidney into the bladder is called the ureter. It is about 10 to 12 inches long, and has a thick wall containing muscle fibres, by the contraction of which urine is forced down the tube. A calculus in the ureter is also forced down by this contraction, and is the cause of renal colic. Kinking of the ureter by displacement of a movable kidney causes the attacks of pain and other symptoms referred to as Dietl's crisis. *See* Bladder ; Hydronephrosis ; Kidney.

URETHRA. The passage by which urine is discharged from the bladder is called the urethra. It is lined with mucous membrane throughout, and its narrowest part is its external orifice, or meatus. Inflammation of the urethra, or urethritis, is usually caused by gonorrhoea (q.v.) and frequently is followed by stricture. It causes difficulty in passing water and the stream becomes smaller. If congestion of the lining of the urethra occurs, as after an alcoholic bout or from chill, there may be complete stoppage of the urine. Occasionally the urethra becomes blocked by a stone, or calculus. A stricture should be dilated periodically with a gum-elastic or metal bougie. *See* Bladder; Gonorrhoea; Prostrate.

URIC ACID. A nitrogenous substance present in the tissues, uric acid is excreted in the urine from 7 to 10 grains being thus got rid of in the 24 hours. It is formed in the tissues by the destruction of nucleo-proteins. These are converted by various ferments into substances known as purin bases, which by other ferments are converted into uric acid. Some foods, such as meat, are rich in purin bases and the consumption of such foods increases the uric acid in the body and urine. In gout the acid is thrown out of solution in the joints and tophi, and this may also occur in the urine, forming gravel or stones in the urinary tract. Uric acid crystals may occur as a deposit in urine. *See* Gout; Lithaemia.

URINE. A watery solution of waste substances excreted by the kidneys, the urine flows down the ureters into the bladder, from which it is voided by micturition. An adult excretes on the average about 50 to 60 ounces of urine in the 24 hours, most of it during the day. Urine is a clear liquid with a straw or a light amber colour. The reaction, as tested by litmus paper, is faintly acid, but after a meal, and in vegetarians, may be definitely alkaline. The acidity is increased by taking much meat in the diet. The specific gravity is normally from 1015 to 1025. It is considerably raised in diabetes mellitus.

The daily quantity of urine may vary in health. Thus, it may be increased in cold weather, or by taking large quantities of liquids, and, conversely, may be diminished in hot weather, when sweating is profuse. The quantity is also greatly affected in some diseases. In diabetes it may amount to many pints daily. In fevers and in acute nephritis there may be a great diminution. If urine has an ammoniacal odour when passed, it has undergone decomposition, and this generally occurs with chronic inflammation of the bladder. The colour becomes deeper as the urine becomes more concentrated. If bile is present in considerable quantity, the colour is mahogany brown, if there is less it is greenish yellow; the froth has a green tint. A small quantity of blood gives the urine a smoky appearance, and larger quantities make it pink or bright red. Rhubarb, senna and logwood impart a red or orange colour, and santonin a bright yellow colour.

In a concentrated acid urine there may be a brick-red deposit of amorphous urates, or, in an alkaline urine, a white deposit of phosphates. Sometimes there is what is called a cayenne-pepper deposit, tiny brown granules appearing in the urine, or on its surface. This deposit consists of crystals of uric acid. The presence of pus in the urine is known as pyuria. *See* Bacilluria; Diuretic; Kidney; Oxalic Acid; Uric Acid.

URTICARIA. *See* Nettle-rash.

UTERUS. *See* Genital System; Womb.

VACCINATION. Human beings can be protected against smallpox by being inoculated with cowpox, or vaccinia, a disease of the cow in which vesicles appear on the teats and udder. Lymph from these vesicles is obtained, treated with glycerin, and stored in little glass tubes. The skin is thoroughly cleaned, and a number of scratches are made with a lancet or needle at four places about an inch apart and the lymph is rubbed into these. In about three days a papule with a red areola appears, and on the fifth or sixth day this becomes a vesicle, or blister, which increases in size until about the eighth day. On the tenth day the contents of the vesicle become turbid from the presence of pus. The liquid contents quickly begin to dry up and form a scab while the surrounding redness lessens, and from the fourteenth to the twenty-first day the scab drops off.

Vaccination is done either on the arm or the leg. The part should be kept scrupulously clean. The amount of inflammation around the vesicles differs in various individuals, and also the amount of constitutional disturbance. If a first vaccination is unsuccessful another attempt should be made, but not until about four weeks after the first one. A successful vaccination almost always confers immunity from smallpox for a number of years, and in some instances for life, but re-vaccination should be done about the tenth year and again at the twenty-first, and always when smallpox makes its appearance in the neighbourhood unless successful vaccination has been performed fairly recently.

VACCINE. The term vaccine is applied to preparations containing dead disease germs which are injected beneath the skin in the treatment or prevention of diseases caused by those germs. When the germs are grown from secretions or blood taken from the patient, so that the vaccine contains the strain of germs actually responsible for his disease, the vaccine is called an autogenous one. *See* Immunity.

VAGINA. The female genital passage is called the vagina. Inflammation of the passage, or vaginitis, may be due to gonorrhoea or to septic infection in connexion with an abortion or otherwise. It may also be caused by a retained pessary or some other foreign body in the passage, or by irritating injections. It may cause a sense of weight and pain in the lower part of the body, and the passage may be very painful and tender. There is more or less discharge, the characters of which vary according to the severity of the inflammation. The vaginal discharge is commonly referred to as leucorrhoea (q.v.), or whites.

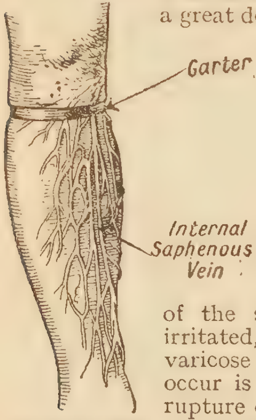
Vaginismus is the name given to a painful spasmodic contraction of the muscles at the entrance to the vagina which causes difficulty in sexual connexion. It may be due to such causes as excessive tightness of the orifice, inflammation of the parts, urethral caruncle, anal fissure or disorders of the womb or ovaries. Treatment depends on the cause. The anterior or posterior wall of the vagina may prolapse and form a cystocele or rectocele as the case may be. *See* Douche ; Genital System.

VAGUS. *See* Pneumogastric Nerve.

VARICELLA. *See* Chicken-pox.

VARICOCELE. A swelling in the scrotum caused by dilatation and tortuosity of veins in the spermatic cord is described as a varicocele. The condition occurs most frequently on the left side and in young men. Its occurrence is favoured by constipation. The swelling, which feels like a bag of worms, disappears almost completely when the patient lies down, as the veins are more or less emptied. There may be a sense of weight, and perhaps dull pain. A slight degree of varicocele should be disregarded, but if larger a suspensory bandage should be worn. A cold bath in the mornings is helpful on account of its bracing effect. Regularity of the bowels should be secured. When the condition is irksome, operation should be undergone.

VARICOSE VEIN. When a vein is dilated, knotty and tortuous, it is said to be varicose. The tortuosity is due to the fact that the vein has become lengthened. Such a fate may come to veins in many situations, but the most frequent is the lower limb, and the vessel usually affected is the long saphenous vein which passes up on the inner side of the leg and thigh.



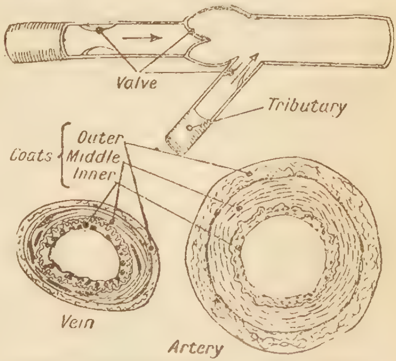
VARICOSE VEIN. The result of a tight garter

Anything that impedes the circulation in the veins is apt to cause varicosity. The weight of the blood itself in a long vein is considerable, and in persons who have to stand a great deal, such as shop assistants and policemen, this often causes varicose veins. The risk is very considerably increased if tight garters are worn instead of suspenders. Pregnancy is a common cause in women, as the enlarged womb presses on the great veins through which blood from the lower limbs is drained. A tumour in the pelvis might have a similar effect, and even constipation. The obstruction to the venous flow tends to cause dropsy, and this is especially marked about the ankle. The nutrition of the skin consequently suffers, it is easily irritated, and this may be the beginning of a varicose ulcer. Another complication that may occur is thrombosis (q.v.). Yet another risk is rupture of a vein and the occurrence of very free, and possibly fatal, bleeding. The compulsory provision of seats for shop assistants and others similarly employed should lessen the risk that they run. During pregnancy the weight on the veins may be relieved by lying down with the legs elevated on a cushion at intervals during the day, and by the improvement of the circulation by massage and bandaging. When the veins have become varicose, an elastic bandage (q.v.) or stocking should be worn. It should be put on before getting out of bed in the morning, and should not be taken off till the patient is again in bed. It may be useful also to massage the limb at night in an upward direction. Gentleness is necessary because of the risk of injury to the vein and consequent thrombosis. When varicosity is severe a radical cure should be sought. This may be procured by an operation or by the injection method. This consists of injections of sodium salicylate, quinine or some other substance into the veins with the object of producing a firm clot in the vein and thus closing it. *See* Vein.

VASOMOTOR NERVE. Branches of sympathetic nerves pass to blood vessels. They cause contraction of the muscle fibres in the vessel-wall and so constrict the arteries or, on the other hand, cause relaxation of the arteries, and are therefore called vasomotor nerves. *See* Sympathetic Nervous System.

VEGETARIANISM. A strict vegetarian diet is not to be recommended, as it lacks sufficient protein. The addition of eggs and milk to a vegetarian diet may make all the difference, however, and the only criticism that can be made against such a diet is that it is so bulky that it may cause gastric and intestinal distension in some persons. See Diet ; Food.

VEIN. A vessel that returns blood to the heart is called a vein. It has the same three coats as an artery, but the middle one is less developed and the wall of a vein is therefore thinner. Many veins are provided with valves which are semilunar folds which open out when the blood attempts to flow backwards. The blood in veins is of a dark purplish colour, except that contained in the pulmonary veins, which is pure blood in transit from the lungs to the heart. All the venous blood from the body, except that from the heart itself, is poured into the heart through two large veins called the superior and the inferior vena cava.



VEIN. The three coats of a vein are thin and inelastic compared with those of an artery. Above, diagram of vein valves

A vein begins as a tiny vessel, or venule, which gathers up blood from the capillaries. Several venules pour their blood into a larger vein, and this into one still larger, until the main venous trunks are reached. The portal vein, which drains the blood from the stomach, bowel, spleen, pancreas and gallbladder, is peculiar in that it breaks up into capillaries. Veins as a general rule follow the course of the arteries, and many are named after the arteries they accompany.

A wound of a vein is, generally speaking, less dangerous than a wound of an artery, as bleeding is more easily controlled. Bleeding from a varicose vein may be very profuse, however, and possibly fatal. A wound of one of the large veins of the neck or in the armpit is dangerous, as, apart from the loss of blood, air may be sucked into the vessel and form an air-embolus.

Inflammation of a vein, or phlebitis, may be of a septic or a simple character. Septic phlebitis may be caused by organisms circulating in the blood or making their way into the vein from septic tissues which surround it. It is a very dangerous condition as clotting, or thrombosis, occurs in the vein, and the clot becomes infected. Small portions of the clot are likely to break off into the circulation and cause pyaemia (q.v.). Simple phlebitis is more prone to occur in the gouty and in those who are anaemic, especially when the veins have been in a varicose condition for a long time. It may also be caused by injury to the vein or by thrombosis (q.v.) occurring within it.

The occurrence of phlebitis is marked by pain and tenderness in the line of the affected vein, which is felt to be firm and cord-like. Usually there is some degree of fever, and this may precede the appearance of local signs by a day or two. If a large deep vein of a limb is involved, the limb below the site of the mischief becomes progressively swollen, and brawny to the touch. A person suffering from phlebitis should rest in bed, and if the affection is in one of the veins of a lower limb, as it most commonly is, the limb should be swathed in cotton wool and elevated on a pillow. Pain may be relieved by smearing glycerin of belladonna along the line of tenderness. The weight of the bedclothes should be taken off the limb by using a bed-cradle. The limb should always be moved very gently.

The diet at the beginning should be light, and regularity in the action of the bowels should be maintained throughout. Large doses of sodium or potassium citrate are sometimes given in order to lessen the risk of thrombosis. This treatment should be carried out until all signs have been gone for at least a fortnight, and if no thrombosis has occurred the patient may be able to get up at the end of a month. Before he gets up, the limb should be massaged and moved gently. *See* Bleeding; Circulation of the Blood; Thrombosis; White Leg.

VENEREAL DISEASE. *See* Chancre; Gonorrhoea; Syphilis.

VENESECTION. *See* Bleeding.

VENTILATION. If free access of air to dwellings is prevented by their being crowded together, or anything prevents its passage through the dwellings, ill health is bound to follow. The principal agent in natural ventilation is a fireplace with the chimney. The wind blowing across the top of the chimney sucks air out and a fire or lamp below heats the air and sends it upwards. There is thus a strong upward draught carrying air out of the room, and this loss must be replenished through windows and doors. A window should be constantly open, as air coming in by this route must obviously be fresher than that coming in through an inner doorway.

The complaint is often made that an opened window causes a draught, but this happens because the window is not opened sufficiently far. Another method of preventing draught is to give the current of air an upward direction as it comes through the window. One way of doing this, devised by Hinckes Bird, is to place a closely fitting board, 3 or more inches high, beneath the lower sash, this raising the sash correspondingly. The current of air flows up in the space between the two sashes. Another method is to have the upper sash hinged below so that it can be allowed to slant backwards. When a window cannot be opened a Cooper's disk may be fitted. This has openings through it which can be brought over similar openings cut in the window.

To secure efficient ventilation it is essential that there should be sufficient cubic space in a room according to the number of persons occupying it. When it can be obtained there should be at least 1,000 cubic feet per head. *See* Air.

VERMIFUGE. A drug, such as jalap, that may expel worms from the bowel, although unable to kill them, is called a vermifuge. A drug that can kill worms is called a vermicide. Oil of male fern and santonin are examples. *See* Worm.

VERONAL. A derivative of urea, veronal is a powerful hypnotic drug which produces a natural type of sleep. Poisonous doses produce coma with great depression of the heart. If an over-dose has been taken and the patient is still conscious an emetic of mustard and water should be given at once, and then strong hot coffee freely. The patient should be kept warm by blankets and hot-water bottles. If unconscious, a pint of warm coffee should be injected into the bowel. *See* Hypnotic.

VERTEBRA. *See* Backbone.

VERTIGO. *See* Dizziness.

VIRUS. The poison produced in the course of an infective disease and capable of reproducing the disease when inoculated into another person is called a virus. It may contain visible micro-organisms, but in some instances no organisms have been demonstrated. When the infective virus can pass through a porcelain filter it is called a filterable virus.

VISCEROPTOSIS. Sagging of the abdominal organs is known as visceroptosis. Sagging of an individual organ is described by a name indicative of the organ. Thus, sagging of the stomach is called gastroptosis. The condition is most common in women. In the causation of visceroptosis, lessening of the forward curve of the lumbar region of the spine and weakness of the muscles of the anterior abdominal wall take a prominent part. The straightening of the back is generally part of a poor skeletal development due to lack of exercise in girlhood, often combined with underfeeding. From the same causes the muscles of the abdominal wall are also weak, but they may also be weakened by frequent pregnancies and other circumstances that stretch them unduly. The abdominal viscera are partly supported by pads of fat, and a rapid loss of this fat through some wasting disease will tend to cause visceroptosis. This is the common cause in elderly men. Constant overloading of the bowel is another possible factor. In association with visceroptosis peritoneal bands may be found, fixing the intestine down to the abdominal wall.

Sufferers from visceroptosis complain of a feeling of weight and probably of a dull pain in the lower abdomen. These sensations are caused by dragging on the nerves contained in the peritoneal attachments of the organs. Also the sagging of the digestive tube at some parts is apt to cause kinking, and hence more or less obstruction to the flow of the contents of the tube. So from gastroptosis there may arise dilatation of the stomach with dyspepsia and vomiting, and from kinking of parts of the gut, constipation. Sagging of the liver may cause kinking of the bile-ducts and jaundice, while colicky attacks may result from twisting of a prolapsed kidney or spleen. In some instances visceroptosis has imitated appendicitis, both acute and chronic, gall-stones, and other abdominal disorders.

When visceroptosis is suspected the patient is examined both in the recumbent and upright positions. It may be found that although the abdominal wall is quite flat when lying down, there is a definite bulging of the lower part when the patient is upright. In the early stages of the disorder much good may be done by rest, combined with graduated general and abdominal exercises. The diet should be easily digestible and the bowels should be kept moving regularly. A belt that supports the lower part of the abdominal wall is also useful. When such methods fail an operation should be considered. *See* Abdomen; Belt; Intestine.

VISION. The sense of sight, or vision, furnishes us with knowledge regarding the form, colour, solidity, position, distance and movement or stillness of external objects. The mechanism of vision is discussed under the heading Eye. The acuity of vision, that is the ability to see objects and recognise their shape, is usually noted by means of test types. These are black letters printed on a white board, the size of the letters being such as should be easily visible to the normal eye at distances from 6 metres upwards. There are different theories accounting for the perception of colour, that most favoured being Koenig's, which is that there are separate cones for distinguishing red, green and violet. *See* Colour Blindness; Eye.

VITAMIN. *See* Diet; Food.

VITRIOL. *See* Sulphuric Acid.

VOMITING. The forcible expulsion of the contents of the stomach through the mouth, vomiting is generally preceded by nausea and with this a free flow of saliva. The first thought on the occurrence of vomiting will generally be that it is due to some disturbance of the stomach itself caused by the ingestion of unsuitable food or of some irritant poison, but there is a very large list of possible causes many of which have no connexion whatever with the digestive apparatus. Those that have such a connexion, apart from gastric affections themselves, include irritation in the pharynx, irritation or obstruction of the intestine, appendicitis, gall-stone, and other affections of the liver and gall-bladder, and pancreatic affections.

On the other hand, vomiting may occur in the eye disorder known as glaucoma, and even in ocular headache caused by errors of refraction ; it occurs in some ear disorders in which there is disturbance of the apparatus concerned with preserving balance ; it is a common incident in pregnancy ; it usually occurs when there is renal colic ; it may be an early symptom of meningitis.

Vomiting may also be provoked by substances circulating in the blood. Thus, a hypodermic injection of apomorphine brings on vomiting very quickly. In certain diseased states vomiting is also common for the same reasons, as, for example, in fever, chronic kidney disease and the condition of acidosis.

Information regarding the cause of vomiting may be derived from an examination of the vomitus, or vomited matter. Frequently this will consist of undigested food simply, but when vomiting is caused by corrosive poisons, the vomitus may contain shreds of stomach-lining and blood. In gastric ulcer and cancer there is also blood, but there are other causes for blood vomiting, or haematemesis, as it is called. After severe vomiting from any cause there may be a streak of blood in the vomit, merely from the effects of straining. Bile is often found in the vomit. It gives it a yellow or green colour. A considerable amount of mucus occurs in the vomit of chronic gastritis, particularly when the cause is alcoholism. In dilatation of the stomach large quantities of vomit are brought up from time to time, and it has a frothy appearance and a yeasty smell.

The treatment of vomiting depends on the cause, and in many of the conditions above mentioned treatment will have to be directed to other things than the vomiting, which is merely incidental. When the cause is irritating food or something of the kind, it is desirable to give large draughts of tepid water. This washes the stomach out, and makes the act of vomiting less distressing. Sips of hot water may check vomiting, though sometimes sips of iced soda water or iced champagne are more successful. Counter-irritation over the pit of the stomach by applying a mustard plaster is another useful measure. Many drugs, including bismuth, morphine, dilute hydrocyanic acid, and others are used in treatment. A convenient remedy may be found in a single drop of tincture of iodine in a tablespoonful of water, the dose to be repeated every 15 minutes for five or six doses. *See* Emetic ; Indigestion ; Poisoning ; Sea-sickness.

WARBURG'S TINCTURE. A remedy sometimes used in malaria, Warburg's tincture contains quinine sulphate, aloes, rhubarb, white agaric, opium and aromatics. The dose is 1 to 4 drachms and is taken after the bowels have been cleared.

WART. There are various kinds of wart, but each consists of an overgrowth of skin-papillae and the overlying epidermis. The common wart occurs most frequently in children, favourite sites being the back of the hand, but it may also occur on the face and elsewhere. Naturally it is yellowish in colour but frequently is brown or black from ingrained dirt. The common wart is contagious, but the virus that produces it has not been identified.

In children a wart frequently disappears without treatment. A recent wart may be treated with an ordinary corn plaster or by painting on collodium callosum daily for some time. Older warts are best treated by applying glacial acetic acid daily for a short time. This can be done with the end of a match. If the skin around becomes inflamed the application should be interrupted for a day or two. If a wart resists simple treatment it can be removed by a doctor by freezing with carbonic acid snow, electrolysis, ionisation, the cautery, or X-rays.

A seborrhoeic wart occurs in elderly people or in those with a greasy skin. It is flattened and brownish or black in colour and most often appears on the trunk. If irritated it may become cancerous in character. These warts can be removed by carbonic acid snow, radium or X-rays. Any attempt to remove them by caustics is dangerous. Venereal warts are such as occur about the external genital organs. They are soft and vascular, and bleed easily. The parts should be kept very clean and strong alum solutions or some other astringent remedy may be used, but treatment by X-rays is better.

WASP STING. *See* Bee Sting.

WASTING. *See* Atrophy; Emaciation.

WATER-BED. *See* Nursing.

WATERBRASH. The regurgitation of a hot, acid liquid into the mouth is termed waterbrash. *See* Indigestion.

WATER ON THE BRAIN. *See* Hydrocephalus.

WAX. *See* Ear.

WEIL'S DISEASE. A febrile disorder accompanied by jaundice and commonly by haemorrhages also, Weil's disease is caused by infection with a spirochaete. The disease occurs in rats, and the micro-organisms are discharged in their urine and can infect earth and water. The infection may be acquired from food or drinking water polluted by rats or otherwise, but can also be acquired by bathing in infected water. The symptoms come on abruptly with high fever. Jaundice appears on the fourth day and increases until the tenth day. There may be haemorrhages into the skin, and blood may be vomited or coughed up. The treatment includes that of fever (q.v.). A specific anti-serum has been used successfully. *See* Jaundice.

WEIR MITCHELL TREATMENT. The regime introduced by Dr. Weir Mitchell for the treatment of hysteria and similar disorders consists of isolation, rest, a generous diet and massage. The treatment lasts for several weeks, and at the beginning rest and isolation are absolute. At first the diet consists of milk only, three ounces every three hours ; but gradually the amount of milk is increased and solid food is added. Massage begins after two or three days.

WEN. A sebaceous cyst is popularly known as a wen. It is formed by the accumulation of the secretion of one of the sebaceous glands of the skin, and the cause of the accumulation is obstruction of the duct. The commonest sites for a wen are the scalp, the face and the back, and women are more often affected than men. A small, soft swelling forms and gradually enlarges, reaching the size of a hazel nut as a rule. The skin over the wen becomes thinned, and very often is reddened. Treatment consists in opening the cyst, and evacuating the contents.

WHEY. The watery liquid that remains when the clot formed in milk by the action of rennet is removed is called whey. It contains about 4½ per cent of sugar and small quantities of protein, fat and salts. It also contains vitamins. The treatment of disease by giving large quantities of this liquid, and no other food but vegetables and fruit, is described as the whey cure. This is chiefly used in dyspepsia from overfeeding and some cases of chronic bronchial catarrh ; but whey is a useful beverage also in fevers, kidney diseases and some other complaints.

WHITE LEG. Swelling of the leg, which at the same time becomes of a dead white colour, sometimes occurs in the mother after childbirth and is popularly known as white leg. It most commonly affects the left leg. The limb feels hard and brawny and does not pit on pressure. The swelling is due to inflammation in the lymphatics and obstruction to the drainage through these vessels. The inflammation is caused by septic infection, which often gains entrance to the tissues through a tear in the neck of the womb. White leg is treated by rest in bed with the limb elevated on pillows, and the application of belladonna and glycerin for the relief of pain. Massage will later prove useful. *See* Lymphatic System ; Thrombosis.

WHITES. *See* Leucorrhoea.

WHITLOW. Septic inflammation going on to suppuration in a finger or thumb, and caused by the prick of a thorn, pin or something of the kind, is described as a whitlow. It occurs first as a painful, tender red spot, but this soon becomes the site of a blister filled with matter. If the mischief is situated more deeply the finger swells and becomes reddened. In the deeper forms the glands in the armpit become inflamed and swollen and may suppurate. Moreover, if there is infection in the tendon sheath it may extend into the hand, or, if the whitlow is in the thumb or little finger, to the wrist and forearm, and abscesses may form in those situations. There are fever and other constitutional symptoms, the severity of which depend largely on the extent of the local mischief. Suppuration in the tendon sheath is likely to be followed by sloughing of portions of the tendon, and possibly by suppuration in the joints or death of portions of bone. There is always a possibility of septicaemia occurring.

It follows, therefore, that prompt and skilful treatment is required for a whitlow. It is dangerous to continue poulticing a whitlow for some days without consulting a doctor. For the subcuticular variety all that is needed is to open the blister, clear out the contents and snip off the loose skin. This is a painless operation. The part is then dressed with boracic lint. The deeper varieties are treated by a free opening through the skin to drain the pus. The finger is then soaked for one or two hours at a time in an antiseptic lotion and covered with antiseptic dressings in the intervals of the soakings. The arm should be supported in a sling with the hand well raised.

WHOOPING COUGH. An acute, infectious disease characterised by peculiar bouts of coughing, whooping-cough is caused by a microbe which is generally found in the sputum. It is usually communicated by close personal association with an infected person but may also be carried by the toys of the patient or by other fomites. The disease is most common in young children. The incubation period is from seven to fourteen days, after which symptoms appear and suggest that the patient is suffering from a cold, with more or less feverishness, and a hard cough. The characteristic cough may occur after a few days or not for two or three weeks. It consists of a series of short, quick coughs succeeded by a long drawn out crowing sound. This constitutes the whoop. The attack usually ends with the expulsion of some sticky mucus, although often it ends in vomiting.

During the attack the child's face becomes dusky red and the eyes bulge and may become bloodshot. The nose may bleed. The child commonly stoops forward with the hands on the thighs or sides in order to assist the expulsive effort. In young children the paroxysms may induce convulsions. The paroxysms occur on the average every two or three hours during the day, and generally they are more frequent at night. Interference with sleep causes depression, and insufficient nourishment from lack of appetite, and often from frequent vomiting, leads to wasting. The severe paroxysms may recur for three or four weeks, after which they decline in frequency and severity, but for some months there may be an occasional return of the cough. The chief complication is broncho-pneumonia.

A person suffering from whooping-cough should be isolated for six weeks from the onset of the whoop, and infants who have been in contact with the disease for three weeks from the last date of contact. Children who show signs of a cold during an epidemic should be isolated under careful observation.

The room occupied by a patient suffering from whooping-cough should be well ventilated, but the temperature should not be allowed to fall below 65° F If there is feverishness the child should be kept in bed, but when the temperature is normal it may be allowed up and even out of doors for short spells if the weather is fine. The clothing should be warm. Food must be light and often must consist mainly of milk and eggs, beaten up with milk or as a light custard. If vomiting is frequent a little food should be given as soon as a bout is over, and in any case meals should be small and frequent.

Someone should be at hand to help the child during a paroxysm and to reassure it, and a basin should be put down to receive the sputum which should be at once disinfected or burnt. Cresolin vaporised by heat and other inhalations are sometimes used. In order to loosen the sputum, a simple cough mixture containing paregoric is often given. *See* Broncho-pneumonia ; Disinfection ; Fever ; Infectious Disease.

WIND. *See* Flatulence.

WINDPIPE. *See* Trachea.

WINTERGREEN. *See* Gaultheria.

WITCH HAZEL. The bark of witch hazel, hamamelis virginiana, contains tannic acid, and the leaves tannic acid and a volatile oil. From the former is prepared tincture of hamamelis, and from the latter, liquid extract of hamamelis, and the ointment of hamamelis. Liquid extracts are also sold as hazeline and Pond's extract. Preparations of witch hazel are used as astringents and for the arrest of bleeding. The ointment is an excellent remedy for piles.

WOMB. The uterus or womb is a hollow organ with a thick wall, measuring, in the adult virgin, about 3 in. long, 2 in. at its widest part, and 1 inch at its thickest part. The mucous membrane lining it undergoes alterations before each menstrual period to fit it for the reception of a fertilised ovum, and when this event does not take place, is stripped off and discharged in the menstrual flow.

The womb may be displaced by the pressure of tumours or other swellings, adhesions to other organs, which drag upon it, or by its own weight. The womb grows during pregnancy to a length of 12 in., but within a few weeks after childbirth it should have reverted to a size approaching that of the virgin womb. Sometimes there is a congenital weakness of the ligaments of the womb, associated with a tendency to sagging of the abdominal viscera, a condition described as visceroptosis. Frequent straining, in consequence of chronic constipation or a chronic cough, tends to displacement of the womb. Slight degrees of displacement may cause no symptoms, but when the condition is more pronounced, there is a sensation of weight and dragging in the lower part of the abdomen, the menstrual flow may be excessive and painful, and there is leucorrhoea, or whites. The treatment of a displacement will depend upon its cause.

The commonest tumour of the womb is what is called a fibroid, or a fibro-myoma. This rarely occurs before the age of thirty, and is commoner in unmarried and in childless women. If a fibroid is causing no symptoms, it may be left alone, but its progress should be kept under observation by a doctor. If it is causing bleeding or other symptoms, and the patient is in the child-bearing period of life, the growth should be removed.

Cancer of the womb causes irregular bleeding, and may cause no pain until a late stage. Bleeding after the menopause, or after sexual intercourse, should always be reported to a doctor. *See* Endometritis ; Genital System ; Menstruation ; Parametritis ; Perimetritis ; Pessary ; Visceroptosis.

WORM. A large number of species of worm have been found leading a parasitic existence in the human body, some of them in the digestive tract, and others in the blood or elsewhere. The threadworm is very common in children, but is also found in adults. The female is about ½ in. long. The worm gets into the body by the eggs being swallowed. These hatch out in the intestine, the worms mature, and as a rule are eventually voided in the stools. Threadworms also wriggle their way out through the anus, around which they cause considerable irritation, and may make their way into the vulva and vagina and cause irritation and a discharge there.

Children suffering from threadworms may be restless and peevish, the appetite may be poor, and they may complain of colicky pains. They may suffer from night terrors and sometimes from convulsions. The worms can readily be seen on inspection of the motions. To get rid of them an enema may be given twice a week for a few weeks, and also a few doses of santonin by the mouth, but as santonin may cause poisoning, it should only be given to young children under medical observation. The enema may consist of a solution of common salt, a tablespoonful to the half pint, or of infusion of quassia. A young child should receive about 6 ounces, and older ones up to ¾ pint. The anus should be washed on rising and after the bowels move, and should be kept smeared with an ointment consisting of equal parts of soft paraffin and white precipitate ointment.

The roundworm resembles the ordinary earth worm, but has a whitish colour. Its length varies from 4 to 12 or more in. It inhabits the small intestine, but may make its way into the stomach and even up the gullet and so may get into the trachea and air tubes. When few worms are present, there may be no symptoms. Sometimes, however, there is restlessness, and, in young children, convulsions. There may also be a capricious appetite, itching at the nose and anus, nausea, vomiting and diarrhoea, sometimes with bloody stools. The most effective drug in killing roundworms is santonin, and an adult might take a powder consisting of 3 grains of santonin and 2 grains of calomel at bed-time, and follow this with a dessertspoonful of salts in half a glass of water in the morning. The dose might have to be repeated on one or two nights. It should be noted that after taking santonin the urine is tinted orange or red, and that there may be green or yellow vision for a short time. The eggs are swallowed in polluted water or on fresh vegetables.

The whipworm is usually found in the caecum, but occasionally wanders to other parts of the intestine. It may cause appendicitis, or, by piercing the bowel, may give rise to peritonitis. There is no reliable anthelmintic against this parasite, but the possibility of infection by it is one reason for boiling all questionable drinking water.

A tapeworm consists of a head, a neck, and a succession of flat segments, or proglottides. In its larval stage it is known as a cysticercus, and various species are found in the meat of the pig, the ox, and in that of pike, salmon and perch. These are the tapeworms most commonly found in human beings, and they occur where it is the habit to eat the foodstuffs mentioned either uncooked or imperfectly cooked. That most likely to be encountered in Great Britain is taenia solium, which is got through eating measly pork. When the meat is consumed the cyst is dissolved, and the worm matures in the lining of the small intestine. It may reach a length of 30 ft.

As a rule symptoms are indefinite and the first indication of the existence of the parasite is the passage of proglottides in the stools. The drug most often used is oil of male fern, 30 to 40 minims of the liquid extract of male fern being taken in milk and peppermint water in the morning on an empty stomach, and two hours after a dose of saline. If the bowels have not moved in four or five hours after the anthelmintic is given, a dose of castor oil should be taken. A milk diet only should be taken on the day preceding the treatment. A close watch must be kept on the stools in order to see whether the head comes away, and to facilitate inspection it is well to wash the stools through a strainer made of crepe. The parasite narrows to a fine strand at the end of which is the head, about the size of the head of a pin.

Important roundworms, in addition to those which infest the intestine, are the filaria sanguinis hominis, described under the heading Filariasis, the guinea worm and the trichina spiralis. Human beings usually derive this parasite from infected pork, and the disease resulting from such infection is described as trichinosis. Shortly after partaking of trichinised pork there may be sickness and diarrhoea, but in any case, at about the end of a week, there is pain in the muscles and high fever. There may be difficulty in breathing, in chewing and swallowing. Usually there are signs of dropsy, beginning first in the face. If the disease takes a favourable course, convalescence usually begins about the fifth or sixth week. There is no satisfactory treatment. It is desirable to give an emetic, and afterwards a dose of calomel in order to clear the alimentary tract. Otherwise the treatment is largely that of fever (q.v.). Prevention consists in refraining from eating pork unless it is thoroughly cooked. *See* Bilharziasis ; Filaria ; Guinea Worm ; Hydatid Disease.

WOUND. The immediate treatment of a wound consists in the arrest of bleeding and the relief of shock if such are present, and in cleansing and protecting the wound from further risk of infection. If a wound occurs in the street or elsewhere in the open it should be covered with a clean handkerchief or something of the kind. If tincture of iodine can be secured it should be dabbed over the edges of the wound and surrounding skin. As soon as possible the patient should be taken somewhere for a proper cleansing of the wound. A suitable antiseptic lotion can be made by mixing a teaspoonful of tincture of iodine in a pint of water. For swabbing the wound cotton wool or gauze should be used or, failing either, soft clean cotton or linen rags. A piece of one of these moistened with the lotion is placed on the wound and the surrounding skin is thoroughly cleansed first with soap and water and then with the lotion (*see* Plate 2). A sufficient amount of the lotion is then squeezed into the wound to wash it out, or, if the wound is on the hand or the foot, the part may be put into a basin containing the lotion and allowed to soak for some minutes. If there is grit in the wound that cannot be washed off, it must be cleansed under an anaesthetic. If there is any possibility of earth-soiling of the wound the patient should receive anti-tetanic serum to prevent any risk of lockjaw developing. When the wound has been cleansed the skin around is dried and a dressing of boracic lint or cyanide gauze is put on, then a layer of cotton wool and lastly a bandage. *See* Antiseptic; Bandage; Bite; Bleeding; Bruise; Burn; Collodion; Dressing; Granulation Tissue; Iodine; Iodoform; Lockjaw; Shock; Septicaemia; Tourniquet.

WRINKLE. *See* Beauty Culture; Face.

WRIST. The structures of the wrist, or carpus, include an upper and a lower row of four small bones, the joint between the upper row and the radius and ulna, which is the wrist joint proper, and the joints between the lower row and the metacarpal bones. The adjacent bones of the carpus, which are referred to as the carpal bones, glide on one another and add to the movement that takes place at the wrist joint. Fracture of one of the carpal bones may be caused by injury, the trapezium, to which the thumb is attached, being especially liable to be broken, from the thumb being forced backwards. The existence of the fracture may only be revealed by an X-ray examination.

The muscles that extend the hand are supplied by the musculospiral nerve, and when the nerve is sufficiently damaged by disease or injury there is wrist drop, that is, the hand is flexed and cannot be raised out of this position. Wrist drop also may occur in hemiplegia, or paralysis of one side of the body, or, again, may have a hysterical origin. Wrist drop should always be treated by putting a splint on the front of the forearm and hand, and the hand should be bent backwards by a bend on the splint or by padding (*see* Plate 61). *See* Ganglion; Hand; Joint; Radius; Sprain.

WRITER'S CRAMP. The affection known as writer's cramp is an occupational neurosis. This occurs in people whose occupation involves continuous, rapid manipulations, and besides writers, typists, telegraphists, violinists, pianists and others may suffer. The muscles of the hands and arms become subject to cramps and later on are enfeebled, painful and tremulous. The particular occupation becomes impossible, and also any other in which manipulations are required. A rest from all work of this kind for six months or longer, combined with tonic treatment and massage, may bring about sufficient improvement to permit of work being resumed, but relapse is the rule.

WRY NECK. Bending of the neck to one or other side, when due to spasm or shortening of the muscles, is called wry neck, or torticollis. Besides being bent, the neck is more or less rotated so that the face is directed towards the sound side and a little upwards. Wry neck may be due to a birth injury. If manipulation of the neck is undertaken as soon as the deformity is noticed, a cure may be effected. Wry neck may be caused by rheumatism in the muscles of the neck, by inflammation of glands in the neck, by irritation in the teeth or elsewhere or by spasm, sometimes of a hysterical character. The rheumatic variety is treated by giving aspirin and by gentle massage.

XERODERMA PIGMENTOSA. A rare disease of the skin, which begins in early childhood, xeroderma pigmentosa first manifests itself in little brown spots. Ulcers eventually develop and these soon assume a cancerous character. Several members of a family may be affected and it is thought that the disease may be due to an undue sensitiveness of the skin to the chemical rays of sunlight. The disease is incurable.

X-RAY. There is a very wide field for the use of X-rays in diagnosis, embracing, amongst other things, fractures and other lesions of bone, diseases of joints, disease in the lungs, heart, alimentary tract and in other viscera, the position of foreign bodies in the viscera and tissues, and the state of the roots of the teeth. For the investigation of disorders of the alimentary tract what is called an opaque meal, that is, one containing barium or bismuth salts, is given, and the progress of the meal along the tract is studied. X-rays are also used as a therapeutic agent. When the skin is subjected to a sufficient dose, it is stimulated to activity, and this may be of benefit in chronic skin diseases. By a sufficient exposure to X-rays, epilation of hair may be accomplished in ringworm and other diseases, and the hair will grow again. Another use of the rays is the treatment of pruritus, or itching. X-rays have the power of destroying many new growths, and, whether or not they can remove malignant tumours, they can at least reduce their activities very considerably.

Frequent exposure of the skin to X-rays tends to cause a chronic dermatitis, which later on may lead to cancer. To obviate such risks, X-ray tubes are enclosed in metal boxes, and special gloves and aprons are worn by those who handle them.

YAWS. In many parts of the tropics there occurs a disease which is known as yaws or framboesia and by a number of local names. The cause of the disease is a micro-organism called treponema pertenue. To permit of infection there must be some abrasion of the skin, and on this the treponema may be implanted by direct contact with a yaws sore or through the agency of insects. The sore that ensues passes through two and sometimes three stages, over a period lasting from a few months to a few years. Yaws can be cured by injections of salvarsan and other organic arsenical compounds.

YELLOW FEVER. An acute fever occurring in tropical and subtropical countries, and particularly in South America, yellow fever is caused by infection with a micro-organism called leptospira icteroides and is carried by a mosquito. The incubation period lasts from three to five days, then the temperature shoots up, and there is headache and perhaps pain in muscles and joints. The face is flushed and the eyes injected. There is pain in the pit of the stomach and perhaps vomiting. On the second or third day there is a decline in the severity of the symptoms and, in favourable cases, this may go on to recovery, but in other cases there is again a rise of temperature, and a return of the vomiting which increases in severity, the vomited matter containing altered blood and constituting the so-called black vomit. Large quantities of albumin may be present in the urine. Though the temperature may be stationary or even rising, the pulse rate drops. Jaundice becomes apparent and increases in intensity from day to day.

The incidence of yellow fever has been considerably diminished by mosquito control. Houses known to harbour the insect should be thoroughly fumigated. People suffering from the disease should be screened so that mosquitoes may be unable to get at them. A person who has suffered from yellow fever is rendered immune, but during an outbreak others should receive preventive inoculations. The disease may be cured if injections of Noguchi serum are given during the first day or two. The treatment otherwise is largely that of fever (q.v.) and of the troublesome symptoms. *See* Mosquito ; Tropical Hygiene.

ZINC. A number of zinc compounds are used in medicine, some of them very extensively as outward remedies. The salt occurs as small, colourless, prismatic crystals. It is used in a solution in water as an astringent and antiseptic lotion, the strength varying according to the purpose in view.

Zinc chloride is a powerful corrosive salt. Zinc oxide and zinc carbonate are used to make lotions, creams, ointments, pastes and powders. All are insoluble in water, and a lotion containing one or more of them must be thoroughly shaken just before it is applied. The official zinc ointment consists of zinc oxide and benzoated lard. It is slightly astringent and very soothing in its action, and is much used in inflammation of the skin. Zinc oxide is generally combined with starch or talc in a powder, commonly with some boracic acid also.

POISONING BY ZINC. In acute poisoning by a preparation of zinc an emetic should not be used, but a weak solution of washing soda or some strong tea. Afterwards, egg, milk or olive oil can be given.

ZOSTER. *See* Herpes.